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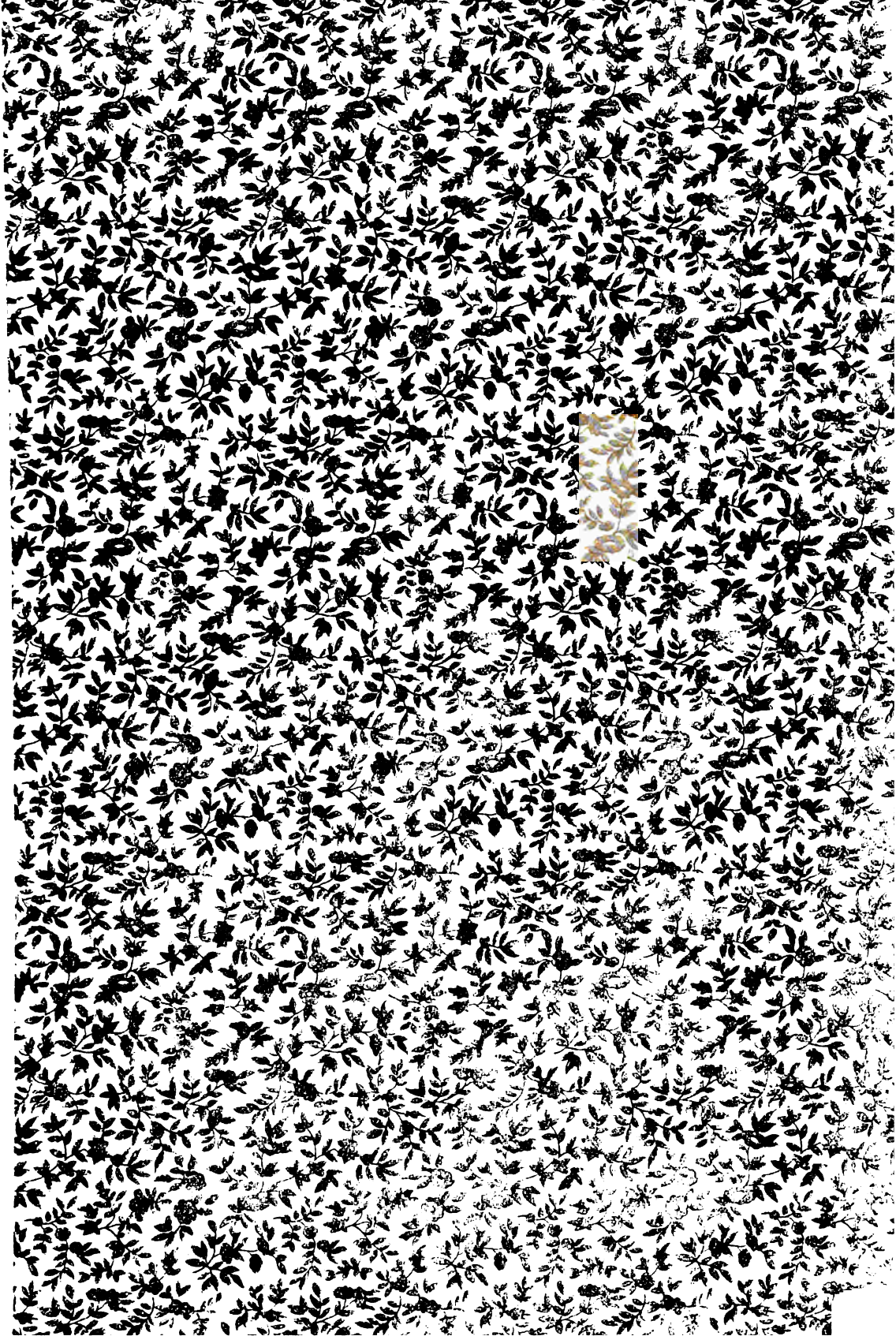
MILITARY SCIENCE
AND
THE ART OF WAR.

TUTHERLY.

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Elementary Treatise

ON

Military Science and the Art of War

BY

HERBERT E. TUTHERLY,

*Captain First U. S. Cavalry, Professor of Military Science and Tactics at the University of Vermont, and on
Duty with the Vermont National Guard.*



Second Edition—With Appendix Upon Cuban War.

Burlington, Vt.,
Free Press Association,
1898.

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PREFACE

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78

The following lectures have been prepared as a military science course in the University, to meet the requirements of the "theoretical instruction" prescribed in General Order No. 93, Adjutant's General's Office, series 1893, for institutions of learning receiving the detail of an Army Officer to act as professor of military science and tactics. The lectures have been prepared upon the assumption that students have drilled one year and have become proficient in infantry drill regulations to include battalion movements, and in artillery drill regulations to include the "School of the Cannoneers." These lectures will be bound in three "parts," Part I being intended as a text-book for sophomores, Part II for juniors and Part III for seniors.

These books may also be found useful to National Guard Officers, and Non-commissioned Officers, as they constitute a progressive course, leading up from armory drill to battle tactics.

HERBERT E. TUTHERLY.

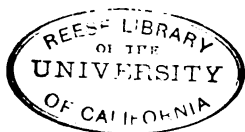
UNIVERSITY OF VERMONT, 1897.

PREFACE TO SECOND EDITION.

In this edition the three "PARTS" are bound as one book of 12 CHAPTERS for use as a text-book for volunteer troops as well as national guardsmen and military colleges ;—it having been suggested by officers who have used the separate "PARTS" of the first edition, that the twelve lectures, taken together, afford a complete elementary course for those who are hastily preparing for military service, and just what they need to go with "drill regulations." The appendix contains some practical lessons gathered from my recent service with our Army in Cuba.

H. E. TUTHERLY,
Captain 1st U. S. Cavalry.

MONTAUK, Long Island, September, 1898.



NOTE.

The following army text-books have been somewhat closely followed in the subjects treated, and should be available as books of reference, in connection with this elementary treatise, which can, at best, be considered only as a guide in the study of the Art of War :

- U. S. Drill Regulations for Cavalry, Artillery and Infantry.
- U. S. Guard Manual.
- U. S. Army Regulations.
- U. S. Army Annual Register.
- U. S. Small Arms Firing Regulations, (Blunt.)
- U. S. Regulations for Troops in Campaign.
- U. S. Manual for Courts-martial, (Murray.)
- U. S. Manual for Hospital Corps Drill.
- U. S. Signal Manual.
- U. S. Army Book of Uniforms (Hollabird.)
- Tidball's Manual for Heavy Artillery.
- Bruff's Ordinance and Gunnery.
- Wagner's Organization and Tactics.
- Wagner's Advance Guard and Outposts, (a catechism.)
- Root's Military Topography and Sketching.
- Military Field Engineering, (Beach.)
- Elements of the Art of War, (Mercur.)
- Military Hygiene, (Woodhull.)
- Horses, Saddles and Bridles, (Carter.)
- Farrow's Millitary Cyclopædia, (last edition.)

CONTENTS.

- Chapter I—Army Organization.
- Chapter II—The Line of the Army.
- Chapter III—The Staff Departments.
- Chapter IV—Military Discipline.
- Chapter V—Moving and Supplying Armies.
- Chapter VI—Castrametation.
- Chapter VII—Guard Duty.
- Chapter VIII—Advance Guards and Outposts.
- Chapter IX—Military Engineering.
- Chapter X—Tactics.
- Chapter XI—Strategy.
- Chapter XII—Battle of Gettysburg.
- Appendix—Cuban War, 1898.

CHAPTER I.

Army Organization.

Armies are composed of the "*line*" and the "*staff*."

The "*line*" includes the three "arms," infantry, artillery and cavalry.

It comprises the fighting force or "combatants" so called in contra-distinction to the staff which comprises the administrative departments usually styled "non-combatants." There are the same grades of rank in the various staff departments as in the "line" and the officers and men of the staff departments are uniformed, armed and equipped, similarly to those of the line.

Engineer troops are organized as infantry and may practically be considered as troops of the "line," although technically they are comprised in one of the staff departments.

The supplies and munitions of war are furnished through the several staff departments.

The tactical formations and movements are prescribed in the three books entitled, infantry drill regulations, light artillery drill regulations, and cavalry drill regulations. Separate drill books for the heavy artillery, hospital corps, and signal corps are also published.

The army (line and staff together) is governed by one code of rules, styled "Army Regulations." All regulations for the army are prescribed by the Secretary of War, who is chief of staff to the President. Orders of the Secretary are recognized as coming from the President, who is the constitutional "commander-in-chief" of the land and naval forces. The President and Secretary of War are, however, both civil functionaries, and the direct military command is exercised by the senior general officer of the army.

Staff.	General officers.....	10
	Military secretary.....	
	Aids-de-camp to general officers.....	
	Adjutant General's Department.....	16
	Inspector-General's Department.....	7
	Judge-Advocate-General's Department.....	8
	Quartermaster's Department.....	138
	Subsistence Department.....	115
	Medical Department.....	908
	Pay Department.....	29
	Corps of Engineers.....	588
	Ordnance Department.....	632
	Signal Corps.....	60
	Post Chaplains.....	30
	Chief of Record and Pension office.....	1
	<hr/>	
	First Regiment of Cavalry.....	626
	Second Regiment of Cavalry.....	647
	Third Regiment of Cavalry.....	635
Line.	Fourth Regiment of Cavalry.....	626
	Fifth Regiment of Cavalry.....	628
	Sixth Regiment of Cavalry.....	633
	Seventh Regiment of Cavalry.....	638
	Eighth Regiment of Cavalry.....	651
	Ninth Regiment of Cavalry.....	612
	Tenth Regiment of Cavalry.....	610
	<hr/>	
	Aggregate of Cavalry.....	6,306
	First Regiment of Artillery.....	838
	Second Regiment of Artillery.....	817
	Third Regiment of Artillery.....	837
	Fourth Regiment of Artillery.....	844
	Fifth Regiment of Artillery.....	822
	<hr/>	
	Aggregate of Artillery.....	4,158
	First Regiment of Infantry.....	553
	Second Regiment of Infantry.....	539
	Third Regiment of Infantry.....	520
	Fourth Regiment of Infantry.....	547
	Fifth Regiment of Infantry.....	546
	Sixth Regiment of Infantry.....	539
	Seventh Regiment of Infantry.....	524
	Eighth Regiment of Infantry.....	526
	Ninth Regiment of Infantry.....	511
	Tenth Regiment of Infantry.....	581
	Eleventh Regiment of Infantry.....	540
	Twelfth Regiment of Infantry.....	530
	Thirteenth Regiment of Infantry.....	528
	Fourteenth Regiment of Infantry.....	554
	Fifteenth Regiment of Infantry.....	490
	Sixteenth Regiment of Infantry.....	541
	Seventeenth Regiment of Infantry.....	543
	Eighteenth Regiment of Infantry.....	547
	Nineteenth Regiment of Infantry.....	543
	Twentieth Regiment of Infantry.....	544
	Twenty-first Regiment of Infantry.....	538
	Twenty-second Regiment of Infantry.....	531
	Twenty-third Regiment of Infantry.....	554
	Twenty-fourth Regiment of Infantry.....	553
	Twenty-fifth Regiment of Infantry.....	549
	<hr/>	
	Aggregate of Infantry.....	13,471
	West Point detachments.....	212
	Guard at military prison.....	105
	Recruits at stations and en route.....	338
	Indian scouts.....	40
	<hr/>	
	Grand aggregate, officers and men.....	27,172
	<hr/>	
	Military Academy Cadets.....	331
	Retired.....	1,631

* For "War footing" see pages 13, 14, 15 and 16. Regiments are brigaded as they concentrate for field operations.

The functions of the various staff departments are as follows :

The *Adjutant General's Department*, is the department of orders, correspondence and records.

The *Inspector General's Department*, is the department which collects information concerning the discipline, drill and efficiency of troops, and examines official disbursements.

The *Quartermaster's Department*, supplies the clothing, tents, camp equipage, fuel, forage and barracks, and provides transportation, both by land and water.

The *Subsistence Department*, supplies the food for men (called rations).

The *Medical Department*, provides medicines and attendance, and has charge of the hospital and ambulance service.

The *Pay Department*, pays officers and men.

The *Ordnance Department*, supplies the small arms, cannons, ammunition and accoutrements.

The *Corps of Engineers* conducts the construction of forts, field works and bridges, railroads and wagon roads.

The *Signal Corps* conducts communication by telegraph, telephone, visual signals, balloons and carrier pigeons.

The *Judge Advocate's Department*, is the military law department,—has charge of court martial records, and advises the General in technical questions of law.

Although military rank is held in the various staff departments the same as in the "line," the command of troops is not exercised by staff officers outside of their own departments, unless they are put on duty under orders which especially so direct.

GRADES & RANK. INSIGNIA. (ARMY.)

IN U.S. ARMY.

SHOULDER-STRAPS
(UNDRESS.)

EPAULETTES & SHOULDER-
KNOTS.
(FULL-DRESS.)

SLEEVES - VERGEE AT

CORRESPONDING GRADES
IN
U.S. NAVY.

1. GENERAL.



CEASED AT DEATH OF
GENERAL HERMAN (1891).

2. LIEUTENANT GENERAL.



SAME AS FOR
GENERAL.

3. MAJOR-GENERAL.



SAME AS FOR
GENERAL.

4. BRIGADIER-GENERAL.

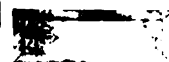


SAME AS FOR
GENERAL.

5. COLONEL.



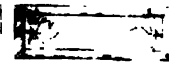
6. LIEUTENANT-COLONEL.



(See Lt.)



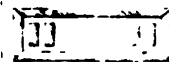
7. MAJOR.



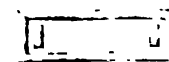
(See Lt.)



8. CAPTAIN.



9. FIRST LIEUTENANT.



1. ADMIRAL.



CEASED AT DEATH OF AD. PORTER
(1891).

2. VICE ADMIRAL.



CEASED AT DEATH OF V. ADM. BACON.
(1820).

3. REAR-ADMIRAL.



(HIGHEST GRADE, 1872.)

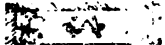
4. COMMANDER.



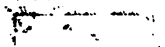
5. CAPTAIN.



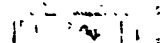
6. COMMANDER.



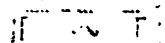
7. LIEUTENANT.



8. LIEUTENANT.

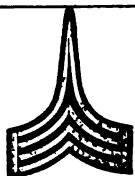


9. LIEUTENANT.

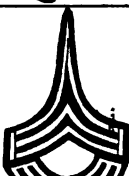


GRADES/RANK.

11 CADET.



CAPTAIN.



ADJUTANT



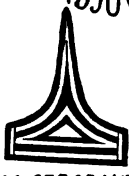
QUARTERMASTER.



LIEUTENANT.



SGT-MAJOR.



Q.M. SERGEANT.



1ST SGT.



SERGEANT.



(WITH BELOW ELBOW)
CORPORAL.

12. SERGEANT-MAJOR.



13. Q.M. SERGEANT.



14



ORDNANCE-SERGEANT.



COM'Y. SGT.



POST Q.M. SGT.



HOS'L. STEWARD.



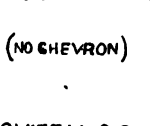
CHIEF-TRUMPETER.



PRINCIPAL-MUSICIAN.



SADDLER-SGT.



CHIEF-MUSICIAN

15.



1ST SERGEANT.



SIGNAL-SGT. 1ST CLASS



16.

SIGL-SGT. 2ND CLASS.



COLOR-SGT.



SERGEANT.

17. CORP'L.



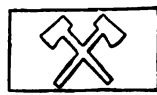
ACT. HOSPL ST'D.



LANCE CORP'L.



FARRIER.



PIONEER.



SERVICE-PEAGE.



SERVICE-WAR.



SIGL CORPS.



BRASSARD.

General officers (only) wear the sash which is of buff silk. Those above the grade of brigadier-general may, at their option, wear the sash across the body from the left shoulder to the right side.

Chaplains wear plain black clothing without shoulder insignia.

General officers, officers of the staff departments and enlisted men of the engineer corps, wear dark blue coats and trousers.

Officers and men of the line and men of the staff departments, except engineers, wear dark blue coats and sky blue trousers.

The colors of trimmings (chevrons, shoulder insignia, stripes, plumes, etc.) of the three "arms" are as follows: infantry, white; artillery, red; cavalry, yellow.

The color of the cadet uniform is gray, with black stripes, and gilt chevrons.

Enlisted men of the hospital corps wear green stripes and chevrons, and the hospital corps insignia is a "red cross."

The colors of stripes and chevrons for enlisted men of staff departments are as follows:

Engineers, scarlet, piqued with white; ordnance, crimson; post-quarter-master sergeants, buff; commissary sergeants, gray.

The term "officer" is applied to only those in the military service who hold a commission from the government, and includes the grades from that of general to that of second lieutenant. They hold their commissions for life.

The term "cadet" is applied to students at the United States Military Academy at West Point, who are undergoing a course of instruction preparatory to becoming officers. "Cadet" is the grade just below that of second lieutenant.

The term "enlisted man" is applied to all in the military service, below the grade of cadet and who enlist for a term of years.

Enlisted men in the military service, holding grades from sergeant-major to corporal, are designated non-commissioned officers.

The following are the commands appropriate to each grade of officers:

Lieutenant, a platoon.

Captain, a company of infantry, troop of cavalry, or battery of artillery.

Major, a battalion of infantry or artillery, or a squadron of cavalry.

Colonel, a regiment. (Lieutenant colonel assists the colonel.)

Brigadier-general, a brigade.

Major-general, a division.

Lieutenant-general, a corps.

General, a separate army.

A lieutenant-general is authorized to select from officers of the army two aides-de-camp, and a military secretary who rank as lieutenant-colonels while so serving.

A major-general may select three aides-de-camp from the captains or lieutenants of the army.

A brigadier-general may select two aides-de-camp from the lieutenants of the army.

These aides constitute the general officer's personal staff, or as sometimes designated, his "military family." They ride next to him on occasions of ceremony and represent him personally on the field of battle.

Each general officer has besides "aides" an administrative staff made up by detailing officers for this purpose from the several staff departments, *e. g.*, the staff of a general officer commanding a corps would naturally be as follows :

Three aides de-camp.

One adjutant-general—chief of staff.

One inspector-general.

One judge-advocate.

One chief quartermaster.

One chief commissary.

One chief paymaster.

One chief surgeon.

One provost-marshal general.

One engineer officer.

One ordnance officer.

One signal officer.

One chief of artillery.

One chief of cavalry.

Each of these staff officers may, and usually does, have assistants, but he himself superintends the duties pertaining to his department within the command and leaves the general free to exercise his higher functions of command and devote himself to the general policy and plans of campaigns.

Division and brigade commanders each have a similar staff to that prescribed above for the corps commander, however, unless a division or brigade is serving

as an independent command the commander does not require a chief of artillery, chief of cavalry, provost marshal, or chief signal officer, and the brigade staff may be much more reduced.

Smaller commanders than generals have corresponding staffs, the members of which exercise the functions corresponding to those upon a general's staff.

The commanding officer of a regiment has, as a staff, an adjutant, a quartermaster, and, in the field, a commissary, each with the rank of first lieutenant; a surgeon, usually ranking as major, and one or two assistant surgeons, ranking as either captains or lieutenants. He also has a chaplain, whose nominal rank is that of captain.

The regimental non-commissioned staff consists of a sergeant-major, quartermaster-sergeant, a chief musician (2 principal musicians in infantry or artillery), (a chief trumpeter and saddler-sergeant in cavalry), three hospital stewards, a commissary sergeant, and acting hospital steward.

A major in command of a battalion or squadron, has an adjutant, whose rank is lieutenant, and a sergeant-major; and, when serving independently, he also details one of the lieutenants of his command as quartermaster and commissary, and has an assistant surgeon assigned from the medical department. He would also detail sergeants of his command to act as quartermaster-sergeant and commissary sergeant, and he would have a hospital steward assigned from the hospital corps.

As a rule the staff officers of a colonel rank as first lieutenants; of a brigadier-general as captains; of a major-general as majors; of a lieutenant-general as lieutenant-colonels; of a general as colonels; while the "chiefs" of the various staff departments rank as brigadier-generals.

These "chiefs" constitute the military staff of the President, with the Secretary of War at the head as chief of staff, and have their bureaus in the War Department at Washington.

The company in infantry, the troop in cavalry, and the battery in artillery are the units of organization in the respective arms.

The war footing of a company of infantry or troop of cavalry is three officers and one hundred and three enlisted men each. Of a battery of artillery six officers and one hundred and seventy-six enlisted men.

These are, however, reduced in peace times, as may be found necessary and expedient, sometimes to as low a maximum company strength as three officers and fifty men.

The student will find in the drill regulations of the three "arms" how these company units are grouped into the larger units, and these again into still larger

ARTILLERY.

Artillery is divided into *light artillery* and *heavy artillery*.

Light Artillery.

Light artillery comprises "*horse*" artillery in which each canoneer is mounted on horseback, for service with cavalry, and "*field*" artillery in which canoneers ride on the carriages, ammunition chests or "*off*" horses.

<i>Battery.</i>	<i>Battalion.</i>	<i>Regiment.</i>	<i>Brigade.</i>
		(The regiment is only an administrative unit. The light artillery usually moves by battalions.)	
1 Captain,	1 Major,	1 Colonel,	} Reg'l Staff. Reg'l N. C. Staff. Usually not Brigaded.
2 1st Lieutenants,	1 Adjutant (Lieut.)	1 Lieutenant-Colonel,	
2 2d Lieutenants,	1 Sergeant Major,	1 Adj't (1st Lieut.)	
1 Ass't Surg. (Lieut)	1 Q. M. Sergeant,	1 Quarterm'r "	
1 1st Sergeant,	1 Chief Trumpeter,	1 Commissary "	
1 Q. M. Sergeant,	728 = 4 Batteries.	1 Surgeon, (Maj.)	
1 Veterinary Serg't	—	1 Chaplain,	
6 Sergeants,	733 Officers and men.	1 Sergeant-Major,	
15 Corporals,		1 Q. M. Sergeant,	
5 Artificers.	24 Guns,	1 Comm'y Sergeant,	
2 Trumpeters,	44 other carriages.	3 Hospital Stewards,	
1 Guidon,		1 Act'g "	
1 Wagoner,		1 Chief Musician,	
48 Drivers,		2 Principal "	
84 Cannoneers,		3 Battalions of 4 bat-	
8 Supernn'ry Driv.		teries each. (Part of	
2 Range Finders,		these may be "light"	
1 Pvt. of Hos. Corps,		and part "heavy" bat-	
—		teries.)	
182 Officers and men.		72 Guns.	
6 Guns,			
11 other carriages.			

Heavy Artillery.

Heavy artillery embraces batteries used for siege and *sea coast* service. The heavy batteries are armed and drilled as infantry, in addition to special tactics for heavy ordnance.

ENGINEER TROOPS.

Engineer troops are organized into companies and battalions and armed as infantry, with 4 officers and 150 men in a company and 4 companies in a battalion. They perform the duties of sappers and miners and pontoniers. They also serve in sea-coast defences and have charge of the torpedo service.

SIGNAL TROOPS.

A company of signal troops,—5 officers and 175 men,—is attached to each corps, and has with it material for 50 miles of portable telegraph line, carried in four wire wagons, four lance trucks and one battery wagon.

HOSPITAL CORPS.

The "hospital corps" comprises the enlisted men of the medical department—hospital stewards, acting hospital stewards and privates. These men are organized into bearer companies—60 men each—ambulance companies—72 men each—and field hospital detachments—40 men each—under officers of the medical department.

*THE DIVISION.

	Officers.	Medical Officers.	Non-Commissioned Officers and Privates.			Aggregate.	Guns.	Other Carriages.	Horses.	Mules.	Total Animals.
			Combatants.	Non-Combatants.	Total.						
C. O. and Staff.....	11	1	22	22	34	3	28	18	46		
Three Infantry Brigades..	405	30	11,142	222	11,364	11,799	69	258	378	636	
Four Batteries.....	22	4	703	4	707	733	24	44	635	635	
Bearer Co.....		3	60	60	63	4	12	12	24		
Ambulance Co.....		3	72	72	75	53	118	18	136		
Field Hospital.....		3	40	40	43	7	12	30	42		
Grand Total.....	438	44	11,845	420	12,265	12,747	24	180	1,063	456	1,519

When a division serves as an independent command, at least 1 squadron of cavalry and 2 or 4 batteries of artillery should be added.

*THE ARMY CORPS.

	Officers.	Medical Officers.	Non-Commissioned Officers and Privates.			Aggregate.	Guns.	Other Carriages.	Horses.	Mules.	Total Animals.
			Combatants.	Non-Combatants.	Total.						
C. O. and Staff.....	15	1	31	31	47	6	37	37	73		
Three Divisions.....	1,314	132	35,535	1,260	36,795	38,241	72	540	3,189	1,368	4,557
Corps Artillery.....	48	8	1,409	8	1,417	1,473	48	88	1,386		1,386
Cavalry.....	43	3	1,239	28	1,265	1,313		7	1,359	40	1,399
Engineers.....	19	1	601	7	608	628		58	12	338	350
Signal Corps.....	5	1	175	175	181		9	38			38
Hospital Reserve.....		3	40	40	43		7	12	30		42
Ammunition Col.....	10	2	350	350	362		121	332	420	752	
Supply Train.....	24	2	774	774	800		469	153	2,814	2,967	
Horse Depot.....	3		100	100	103		1	106	100	206	
Grand Total.....	1,481	153	38,784	2,773	41,557	43,191	120	1,306	6,624	5,146	11,770

* Wagner's Organization and Tactics.

Two clerks and 2 messengers are allowed to each brigade headquarters ; 12 clerks and 5 messengers to each division ; and 18 clerks and 8 messengers to each corps. Each paymaster is also allowed 1 clerk.

A SEPARATE ARMY IN THE FIELD.

Two, three or more corps are united to form a separate army in the field. These armies take the designations of the sections of the country in which they are operating, *e. g.*: "Army of the Potomac," "Army of the Cumberland," "Army of the Mississippi," etc., in the War of Secession.

ARMY OF THE UNITED STATES.

The separate armies making up the military force of the nation are under the command of a general-in-chief who, properly, should have a higher grade than general, *e. g.*: marshal or captain-general. However, in the United States no higher grade than that of general has been created. Washington, Grant, Sherman and Sheridan are the only officers who have attained that grade, and these with Schofield are the only ones who have held the full rank of lieutenant-general. The command of our army has usually been held by the senior major-general.

CHAPTER II.

The Line of the Army.

The general officers and regiments of infantry, cavalry and artillery comprise what is technically termed the "line" of the army. Regiments are not brigaded except as they concentrate for field operations. As they arrive at the place of concentration they are assigned to brigades by the commanding general, or such officer as may be designated to organize the expedition, who assigns a brigadier-general to command each brigade, if officers of that grade be available, otherwise the senior officer of the brigade would be its proper commander.

Brigades will ordinarily be composed of troops of one arm of the service ; however, detachments of the several arms coming together are frequently organized as a brigade.

The brigade, when constituting part of a division, is only a tactical unit, and requires only the staff, non-commissioned staff, messengers, clerks, etc., indicated under the heading **Infantry— War Footing*.

When acting separately, the brigade has such other staff officers as are deemed necessary by the authority creating it.†

The division is the basis of organization in an army, and is both a tactical and administrative unit, commanded by a major-general or the senior brigadier-general present. Supplies are purchased by division staff officers upon the orders of the division commander (or procured from depots by requisitions approved by the division commander) and distributed direct to regiments and by regimental staff officers, issued direct to captains of companies, troops or batteries upon requisitions approved by regimental commanders.

Army corps are only organized by special authority from the President, and corps commanders are designated by the President, as are also those of separate

*Chapter I, page 13.

†See page 11.

armies. Both are usually selected from major-generals, as the higher grades—general and lieutenant-general—have only occasionally been filled in our army.

This latter practice, however, is in violation of the well-known military principle that each unit should have a recognized chief with a particular grade, and history contains many illustrations of evil results therefrom. *In Napoleon's armies, the generals cheerfully served under marshals, and the marshals loyally obeyed the orders of the Emperor; but the conduct of marshals serving under marshals was often insubordinate, and not infrequently led to disaster.

In the War of Secession in this country the same embarrassments to military operations were experienced by requiring general officers to serve under the orders of commanders holding the same grade with themselves.

Brigades in divisions, and divisions in army corps, receive numerical designations upon their organization; as "first brigade, second division;" "third division first army corps," etc. Army corps are numbered in the order of their organization.

Temporary organizations consisting of more than one division, as wings, centers, and reserves, may be formed under temporary commanders, but such temporary commanders will not interfere with the organization or administration of the divisions thus united, and will only direct their movements in marches and on the field of battle. All staff officers who are not otherwise employed at the time act as "aides" to their commanding general on the field of battle.

UNIFORMS.

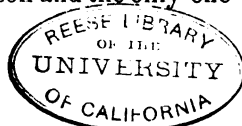
The uniform is as important a factor in accomplishing discipline as the drill, and no time should be lost in putting upon every officer and man who enters the service, a neat and comfortably fitting uniform. The brassard on the sleeve of the company litter bearer and the horse shoe on the troop farrier's sleeve are as necessary as the epaulette and sash of the general officer, and the same soldierly pride must be developed in the private before he will receive his corporal's chevron, that brings the general officer out from the list of colonels.

*Wagner's Organization and Tactics, page 36.

The subject of uniforms has been sufficiently discussed and illustrated in the previous *chapter to enable the student to distinguish rank and “arms” of the service by the most conspicuous marks, viz: shoulder insignia for officers, sleeve chevrons for enlisted men and the colors of trimmings for the various “arms.”

Each button on the uniform has its useful significance, and by the various badges and marks the commander can tell just where each individual of his army belongs in an extended line of battle. The practical military student should make himself further conversant with the subject by a careful study of the illustrated book of uniforms published by the quartermaster-general of the army.

The “full-dress” uniform is only worn upon occasions of ceremony; the “undress” uniform is the one habitually worn in garrison and the only one worn upon campaigns.



GENERAL OFFICERS.

The term “general officers” in the organization table comprises the four grades: general, lieutenant-general, major-general and brigadier-general—those officers who are assignable to command troops of the line—they are in fact “line” officers. The President in making these appointments has usually confined selections to colonels of infantry, cavalry or artillery. They must be conversant with the details of all “arms” and departments, and broadly educated to properly fill their positions, as commanding an army is as great an enterprise as man is ever called to conduct.

The grade of brigadier-general is also given to the highest officer (chief) of each staff department. He wears the uniform of the grade, but with the distinguishing badge of his staff department, and is not included in the organization table under the heading “general officers.”

*Pages 8, 9 and 10.

†General officers are selected by the President from lower grades, while, up to include the grade of colonel, promotion is by seniority.

PROPORTIONS OF THE THREE ARMS.

The proportions of the three arms of the service, making up larger units than brigades depend upon the nature of the service, but as a rule the *strength of the cavalry contingent has in times past been estimated from one-fourth to one-fifth, and the artillery about one-seventh of that of the infantry. However, with the modern extended lines of infantry and their improved weapons, the proportion of cavalry will probably be considerably greater in future wars. The proportion of artillery may also be approximately indicated as from three to four guns to each thousand men of other arms, when operating in a country free from mountains and with good roads, but reduced in proportion as the roads are poor.

INFANTRY.

As heretofore indicated, the infantry comprises about three-fourths of all armies, and for that reason it may be considered as the most important arm ; still it is difficult to rate the relative importance of three arms which are almost inseparable parts of an effective organization.

The infantry will, however, be the arm receiving our most detailed discussion, as it is the arm to which practical instruction is most generally confined in schools and colleges, and the one also covering nine-tenths of the national guard service ; cavalry and artillery being expensive arms to maintain and almost impracticable at most colleges on account of the number of horses necessary, and for a similar reason difficult to maintain in the national guard service of the states.

From a disciplinary point of view all that applies to the infantry applies to any arms of the service, and the administration of affairs is practically the same in all. Even the science of gunnery must be known to the infantryman, the cavalryman and the artilleryman alike. The infantryman has with his modern long range rifle the opportunity to apply highly scientific knowledge to be able to make his rifle do execution two miles away. (The infantry rifle is now sighted for two thousand yards, and will inflict a deadly wound at the distance of two

*Napoleon's rule.

miles.) The infantryman carries but one weapon—the rifle, which has a detachable bayonet, making it either a projectile weapon for long range or a pike for close combat.

Figure 1 shows the infantry soldier equipped for field service—in what is known as heavy marching order. The knapsack, or as it is now called, the

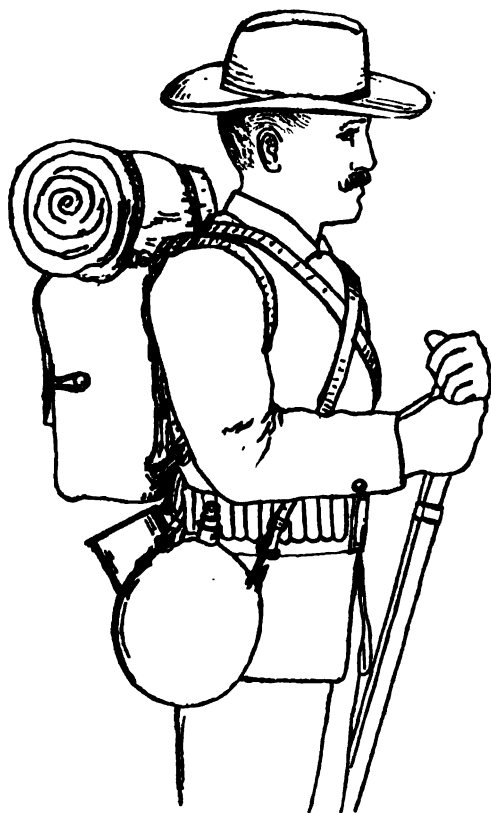


Fig. 1.

blanket bag, is strapped to the soldier's back. In it are carried the blanket and other spare clothing. The overcoat, when not worn, is rolled in the half of a shelter tent, carried by each man, and strapped on top of the blanket bag. A tin cup is hung under the blanket bag. The canteen filled with water is slung on the right side, and the haversack, containing the rations, meat ration-can, knife, fork and spoon, is slung on the left side. The cartridges are carried in a *thimble belt* worn at the waist. The bayonet scabbard is attached to the belt on the left side. The field uniform consists of the undress blouse and trousers, soft drab campaign hat and an *overcoat which has a cape.

The following is the approximate weight carried by the U. S. Infantry soldier :

rifle and bayonet.....	9.50 lbs.
belt.....	.50 lbs.
100 rounds ammunition.....	8.00 lbs.
	—————18.00 lbs.

*In hot climate, a "slicker" should be substituted for the overcoat.

2 days' rations.....	5.30 lbs.
utensils.....	3.00 lbs.
canteen filled.....	3.75 lbs.
	—————12.05 lbs.
1 piece shelter tent.....	2.00 lbs.
1 blanket.....	5.20 lbs.
1 overcoat.....	8.50 lbs.
1 pair shoes.....	3.00 lbs.
1 pair drawers.....	.75 lbs.
1 shirt.....	1.00 lbs.
1 pair stockings.....	.25 lbs.
	—————20.70 lbs.
Total weight.....	50.75 lbs.



Fig. 2.

Figure 2 illustrates the blanket roll used for carrying the soldier's baggage instead of the blanket bag. Although this method has not been officially adopted, as a matter of practice it is frequently used in active service. Even with only a few straps and blanket pins, or with strong twine the soldier may improvise this roll, leaving the shelter tent on the outside to keep the clothing dry.

The roll is worn from the left shoulder to the right side, and with the "roll," the haversack and canteen are hung from the right shoulder to the left side. The figure also illustrates the white helmet worn in hot climates instead of the campaign hat.

RIFLE PITS.



Fig. 3.

Figure 3 illustrates a rifle pit, which is the simplest of earth works—a hole dug in the ground, with the earth thrown on the side toward the enemy, so that men stand, kneel or lie down in the hole, and obtain shelter both from the earth that is thrown out and that which forms the side of the hole.

All soldiers should be frequently drilled in throwing up this hasty shelter. To do this the instructor first lays out the line that the trench is to assume, not straight, but determined by the nature of the ground so as to secure natural cover. The men stack or ground arms and throw the earth to the front with such implements as they have so as to form a parapet; available turf, rocks and logs being used as revetment.

A trench two feet wide and fifteen inches deep shelters one man kneeling and another lying down in rear on the natural surface of the ground; if the trench be four and one-half feet wide it will cover two ranks kneeling, and if the trench be seven feet wide the men can lie down in it.

The infantry of most nations are adopting some kind of intrenching tool for each man to carry, and in some European armies one man of each squad carries a small shovel hung to his belt. Our new magazine rifle has a knife bayonet which is intended for this use. Troops in the War of Secession learned to scrape up hasty intrenchments with the tin cup and triangular bayonet within a few moments after halting, and by the use of the axes and shovels carried in the wagons, these trenches would be deepened and broadened and revetted with logs so as to furnish complete shelter against both infantry and artillery within a few hours after troops went into camp.

In the wars of the future even more importance will be attached to shelter on account of the increased range and rapid fire of small arms, and especially the

terrible slaughter possible among troops, in masses, from the fire of machine guns.

MACHINE GUNS.

It is believed by many that machine guns will eventually become component parts of the equipment of every infantry and cavalry command in the field, and play a most important part in future warfare, but their tactical use must be developed by experience. There are many types of these guns.

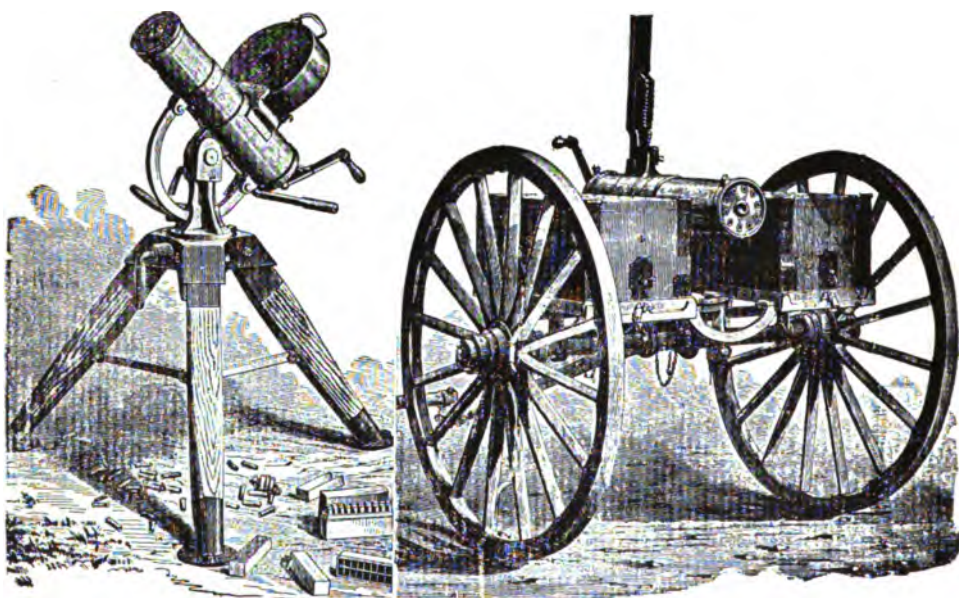


Fig. 4.

Figure 4 illustrates the musket calibre ten-barrelled gatling gun for use with infantry or cavalry. This gun may be drawn by either one or two horses. It is operated by a crank at the breech and fires 1,000 rounds per minute. The weight is only 150 pounds, so that it may be transported upon the back of a mule and fired from a tripod.

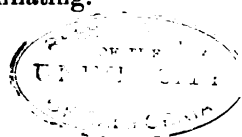
INFANTRY ACTION.

Infantry action consists of fire, shock, and a combination of the two. The actual shock rarely occurs, as one line or the other usually gives way before the bayonets meet, but the moral effect decides the battle, and the resultant of suc-

cessful fire action is the bayonet charge. Some have advocated abolishing the bayonet, but its moral effect both in actual charge and in the feeling that a command is not totally helpless when ammunition is exhausted, more than compensate for the slight weight of the bayonet. Men should be trained in the "bayonet exercise" as well as to fire the piece effectively at a target.

*"The fire of the breech-loading rifle is sensibly felt at a distance of more than 2,500 yards, and becomes serious at nearly 1,700 yards, but it is only at 1,000 yards that the fire becomes really effective. At 500 yards it can be called "decisive," while at 300 yards and under, it is practically annihilating."

CAVALRY.



Cavalry is expensive to equip and maintain, and requires a long course of training to become effective. For this reason European nations keep their cavalry nearly up to the war strength at all times.

It was not until near the close of the War of Secession that our cavalry became effectively organized to serve its fullest functions as an independent fighting force, and the developments of that war practically transformed all of our cavalry into dragoons; dragoons being mounted troops armed and trained to fight on foot with effective fire action, and also to give effective shock action by charging with the saber.

†"The dragoon is essentially the cavalryman of the present day, and the American cavalryman of 1864-5 is the type to which all European mounted troops are more or less reluctantly, or perhaps more or less unconsciously, approaching."

Our cavalryman has three weapons,—a carbine, a saber and a revolver.

*Wagner's Organization and Tactics, page 47.

†Wagner's Organization and Tactics, page 52.

Figure 5 illustrates the cavalry trooper equipped for field service.

The carbine is attached to a * sling worn from the left shoulder to the right side, and when not required for use the carbine is thrust into a boot attached to the saddle in the rear of the right thigh.



Fig. 5.

The pistol-holster is attached to the cartridge belt on the right side. The saber (the end only being visible in the picture) is suspended from the saddle on

*The new "carbine boot" suspended from the pommel ring and sloping back under the soldier's leg does away with the "carbine sling."

the left side. The overcoat, when not worn, is rolled and strapped in front on the *pommel of the saddle. The saddle-bags are attached to the *cantle of the saddle, the "off" one carrying the *tin plate* or *meat can*, *knife*, *fork* and *spoon*, and the "near" one the *curry comb*, *brush*, *watering bridle* and two extra horse shoes (fitted), with the extra ammunition and rations divided so as to equalize the weight of the saddle-bags.

The canteen and tin cup are attached to the "near" or "off" cantle ring. The bed blanket with change of underclothing inside, is rolled in the half of a shelter tent and strapped behind the cantle.

The *side lines* or *hobbles* are lashed on top and the nose-bag drawn over one end of the blanket roll, the *lariat* rolled around the picket pin is snapped into the near cantle ring.

The saddle blanket is folded into six thicknesses and placed on the horse's back under the saddle. The surcingle is buckled over the saddle. The halter is left on the horse's head under the bridle and the hitching-strap tied around the horse's neck or to the near side of the pommel of the saddle.

The illustration shows the soldier at the position of "advance carbine." The carbine is similar in mechanism to the infantry rifle, except that it is ten inches shorter and has no bayonet. It has an effective range of about eight hundred yards against one thousand yards for the rifle, and may be sensibly felt at about three-quarters of a mile. Colt's six chambered revolver, calibre .38, is the model now in the hands of our cavalry. Its total length, including barrel, chamber and stock, is about one foot.

The requirements of instruction are of a more exacting character than in the infantry, arising not only from the three weapons that the cavalryman uses, but from his necessary instruction in riding, the care of his horse, escort and vidette duties, and in fighting both mounted and dismounted. The cavalry has been denominated the "eye and ears" of an army, and upon the outbreak of hostilities is needed at once. It acts as a screen for many miles in advance of the main force, and its efficiency depends upon the energy, dash and judgment of its

*The "pommel" is the front part of the saddle; the "cantle" the back part.

leaders as well as upon thorough discipline secured by long and persistent instruction.

ARTILLERY.

The artillery is the most scientific arm of the service, and requires not only officers technically educated but also skilled men as cannoneers. Its general classification into "light" and "heavy," and its organization have been given in the previous* lecture, and only sufficient details will be added here to acquaint the student in a general way, with artillery armament and equipment.

CANNON.

The cannon is the distinctive weapon of artillery, and technically spoken of as a "*gun*." It is habitually fired from a carriage in contra-distinction to the hand arms with which infantry and cavalry do their fighting. Cannoneers of light artillery are, however, provided with small arms for individual defence and for guard duty; sergeants being armed with the saber and revolver, and other men with the revolver. The men of heavy artillery are armed and equipped as infantry.

As with small arms so with cannon, we may consider muzzle loading and smooth bore guns, with which the War of Secession was fought, as obsolete, and only treat breech loading rifled guns.

The following table gives the breech-loading rifled ordnance now in use:

CALIBRES.	Weight.	CHARGE.		Initial velocity.
		Powder.	Projectile.	
MOUNTAIN AND FIELD ARTILLERY.	Pounds.	Pounds.	Pounds.	Feet.
3-inch mountain gun, steel.....	218	0.88	12.	870.
3.2-inch Light field gun, steel.....	829	3.75	13.5	1675.
3.6-inch Field gun, steel.....	1181	4.50	20.	1554.
3.6-inch Field mortar, steel.....	244	1.00	20.	650.
SIEGE ARTILLERY.				
5-inch guns, steel.....	3669	12.50	45.	1830.
7-inch howitzer, steel.....	3710	9.75	105.	1085.
SEA-COAST ARTILLERY.	Tons.			
8-inch gun, steel.....	14.5	130.	300.	1935.
10-inch gun, ".....	30.0	256.	575.	1940.
12-inch gun, ".....	52.0	440.	1000.	1940.
12-inch mortar, cast-iron, steel hooped.....	15.25	80.	630.	1152.
12-inch mortar, steel.....	13.0	100.	800.	1150.

Figure 6 illustrates the construction and breech mechanism of our field, siege and sea-coast guns, which are of built-up steel. The general system of construction consists in shrinking on to a tube a succession of jackets and hoops, the one over the other. The breech mechanism is known as the "interrupted screw." It is practically the French system, while the Germans have the wedge system. As shown in the above table, cannon are classified as "field," "siege" and "sea-coast" guns, and in addition to the guns proper there are mortars belonging to the different classes.

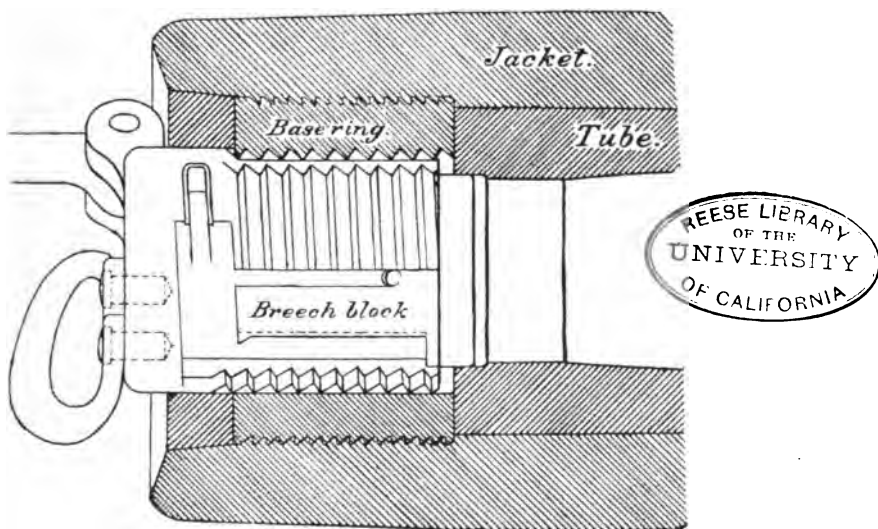


Fig. 6.

LIGHT ARTILLERY.

A field battery equipped with 3.2-inch guns is called a "light field battery ;" one equipped with 3.6-inch guns is called a "heavy field battery ;" and one equipped with 3-inch guns is called a "mountain battery." All of these classes of guns are mounted on carriages similar in construction, only differing in size to meet the varying sizes of the guns, and the carriage of each gun is attached to a "limber" which contains an ammunition chest, the whole, limber and gun-carriage, when the gun-carriage is "limbered up," constituting one vehicle drawn by six

horses. There is also with each gun an extra four-wheeled carriage called a "caisson" for carrying the necessary supply of ammunition, extra parts, etc. This is also drawn by six horses, so that twelve horses are required for drawing each field artillery gun and caisson, besides the saddle horses ridden by the sergeant, who is chief of piece, and the corporal who is chief of caisson; making fourteen horses in all for each gun. In horse artillery ten extra horses are required for mounting the cannoneers of each gun detachment.

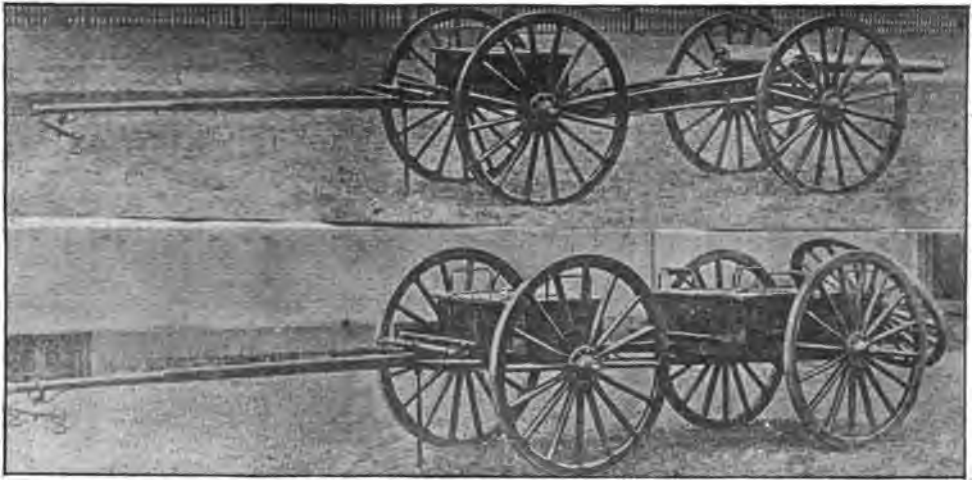


Fig. 7.

Figure 7 illustrates a field piece with its carriage "limbered up" and its caisson, and Figure 8 shows the *horses attached to a caisson with the drivers standing at the heads of the "near" horses. Each driver manages a pair of horses by riding the "near" one of the pair, and the three pairs attached to each carriage constitute one "team." Each horse is saddled like the cavalry horse in addition to wearing the harness necessary to draw the carriage to which he is attached.

† Six guns with their caissons, three extra caissons, a battery wagon and forge and a store wagon, make up the carriages of one light battery, which is

* Only four horses appear in the picture.

† In time of peace four guns constitute a battery and four horses a "team."



Fig. 8.

divided into three platoons of two guns each. A gun with its carriage and caisson constituting a "section" in the terms of drill regulations.

Artillery has no independent role on the battlefields but acts in conjunction with the other arms. Its duty is to prepare and support.

As a *tactical principle it is employed in battalions of three or four batteries, and a single battery is rarely isolated except as a part of an advance or rear-guard or detached for some special service, and a single battery should never be broken up except for fighting in streets or other contracted places in which it would be impossible to find room in a single position for all its guns.

The maximum range of the 3.2-inch gun is three and a half miles, the effective range two and a half miles, and the average rate of firing seventy rounds per hour.

SIEGE ARTILLERY.

These guns are simply larger and more powerful than the light artillery above described, but of the same type, and are mounted on heavier carriages.

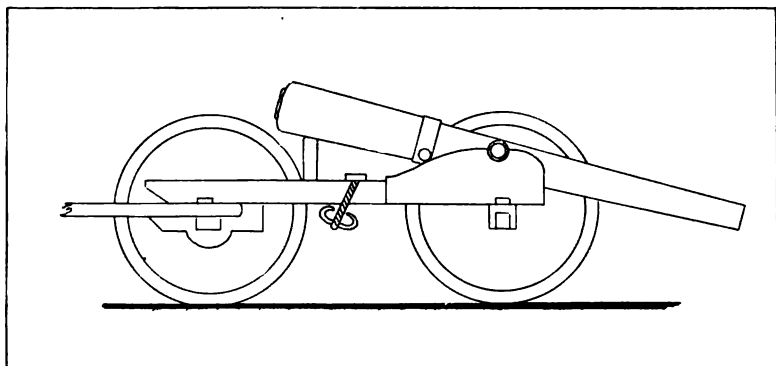


Fig. 9.

They are attached to limbers and drawn by horses similarly to the lighter guns, except that they must move slowly and always upon roads on account of their weight. They are organized into siege trains which constitute component parts of armies in the field, to be placed in batteries behind such field works as may be thrown up.

Figure 9 illustrates the 5-inch siege gun "limbered up" for transportation.

SEA-COAST ARTILLERY.

These guns are intended only for permanent fortifications in our harbors to resist an attack from armed vessels carrying similar guns.

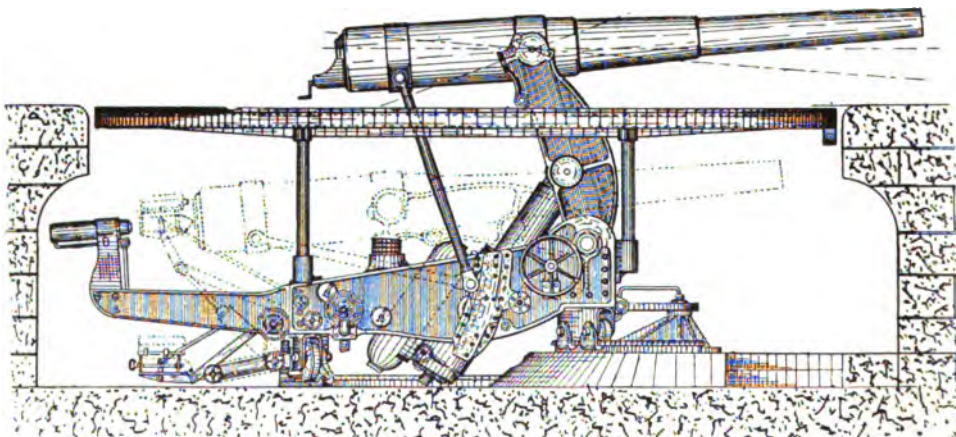


Fig. 10.

* Figure 10 illustrates the 10-inch gun mounted on a "disappearing carriage." The recoil of the gun, when fired, throws it down behind the parapet, in a covered place for loading. The 8-inch and 12-inch guns are of the same type. The 12-inch gun is the largest thus far constructed for our land defenses. It weighs 52 tons, is 36½ feet long; uses a charge of 440 lbs. of powder and an oblong projectile weighing one-half a ton. It is calculated to pierce the heavy armor of ships at ranges from 2 to 4 miles, and its extreme range is about 12 miles. The extreme ranges of the 8 and 10-inch guns are respectively 7 and 9 miles.

* There are better types of disappearing carriages but this will illustrate the system.

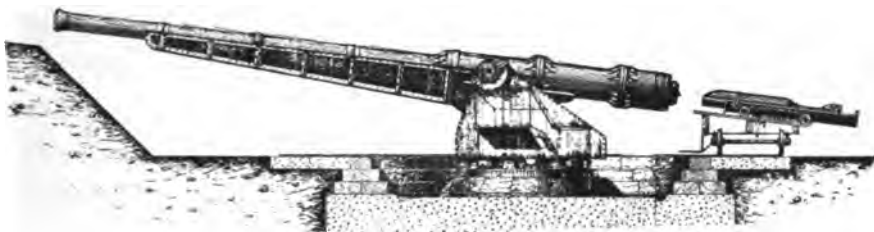


Fig. 11.

Figure 11 illustrates the pneumatic dynamite sea-coast gun, intended to throw, by the force of compressed air, a projectile containing a large charge of dynamite, or some high explosive, over a short range—one or two miles—relying upon the destructive effect of the high explosive at the point of impact. Several of these guns are under contract for supplying the land defenses about our harbors.

MORTARS AND HOWITZERS.

A mortar is a short piece using a small charge of powder, intended for vertical fire. They are fired at as high an angle of elevation as 70° .



Fig. 12.

In figure 12, the 12-inch breech loading rifled mortar is shown. It is proposed to use these heavy mortars against vessels that are able to run the gauntlet of the long range rifle guns, and by firing them at a high elevation drop heavy shells on the decks of vessels where there are only three or four inches of armor against twenty inches on the vessel's side. Sunken batteries of these mortars are under construction in our principal harbors. There are field and siege



Fig. 13.

mortars similar in construction, for dropping shells behind parapets.

There is another type of gun, the howitzer, half way between the long piece and the mortar, and intended to serve the purpose of both direct and angle fire.

Figure 13 illustrates the 7-inch siege howitzer.

SPECIAL TROOPS.

In addition to the infantry, cavalry and artillery which we speak of as the three "arms" of the service, there are troops of the engineer and signal corps and medical department attached to the various *commands; they are organized into companies and battalions, similarly to infantry.

ENGINEER TROOPS.

One battalion of engineer troops is attached to each army corps with units of organization as follows :

<i>Company.</i>	<i>Battalion.</i>
1 Captain,	1 Major.
3 Lieutenants,	1 Adjutant,
10 Sergeants,	1 Quartermaster,
10 Corporals,	1 Medical officer,
2 Musicians,	1 Hospital steward,
64 Privates of the 1st class,	1 Battalion sergeant-major,
64 Privates of the 2d class.	1 Quartermaster-sergeant,
	1 Commissary sergeant,
	4 Privates of the hospital corps,
	616 = 4 companies.
<hr/> Total—4 officers and 150 men.	<hr/> Total—20 officers and 608 men.

*Pages 14 and 15.

Corps Engineer Train,

- | | | |
|---|---|--------------------------------------|
| { | 42 | 6-mule ponton carriages, |
| | 2 | “ trestle “ |
| | 6 | “ chess “ |
| | 1 | “ tool wagon, |
| | 1 | “ forge “ |
| | 1 | “ store “ |
| | 4 | 4-mule wagons for intrenching tools, |
| | 1 | “ baggage wagon. |
| | Total—5 4-mule and 53 6-mule carriages. | |



A detachment of engineer troops with the engineer train of one corps usually moves with the “advance guard” of an army so that bridges and roads may be prepared and obstacles removed ready for the main column.

Pontons are boats made by stretching canvas over frames, and when taken apart several pontons may be packed on one wagon. These pontons are anchored in a stream about twenty feet apart as supports to a bridge; the ends of stringers called “balks” are lashed to the pontons and planks called “chess” laid across these balks to form the bridge. See figure 14.

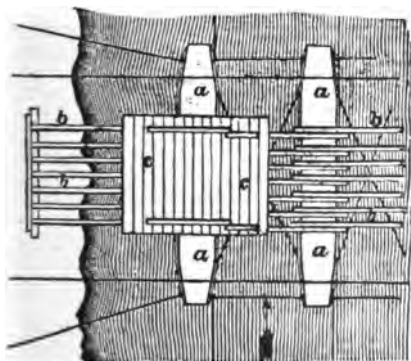


Fig. 14.

- a.—Ponton.
- b.—Balks.
- c.—Chess.

A stream 300 yards wide may be spanned by the material carried in the “corps engineer train.”

A “reserve” ponton train made up of corps trains is maintained at the headquarters of an army under the chief engineer officer, who belongs to the staff of the commanding general; temporary detachments being sent off as circumstances require.

Bridges 700 yards long were laid by troops during the War of Secession.

Engineer troops may be used to fight as infantry when necessary, but this should not be habitual. The employment of engineer troops is further discussed in the next lecture, under the heading “Engineer Corps.”

SIGNAL TROOPS.

A company of signal troops is attached to each army corps, which has with it a telegraph train, consisting of one battery wagon, four wire wagons and four lance-trucks. This train is divided into four sections, each consisting of one wire wagon and one lance-truck. The battery wagon is fitted up as an office, from which four lines may be worked, and contains the necessary batteries, instruments, etc., therefor. Each wire wagon is provided with 10 or 12 miles of wire and a reel for reeling up the wire, and it is also arranged with instruments, stationery, etc., for an office. Each lance-truck carries from 300 to 500 lances, 17 feet long and about $2\frac{1}{2}$ inches in diameter, on which the line is erected, and also a supply of insulators, insulator spikes and equipments, consisting of crow-bars, climbers and marking pins. The signal company consists of 1 captain, 4 lieutenants, (one lieutenant to each section), 1 medical officer and 175 men.

The connection between the corps of an army and between the corps headquarters and general headquarters, may be perfected in a very few hours after the halt of the army. An average speed of 3 miles an hour has been made in the erection of lines over fair ground.

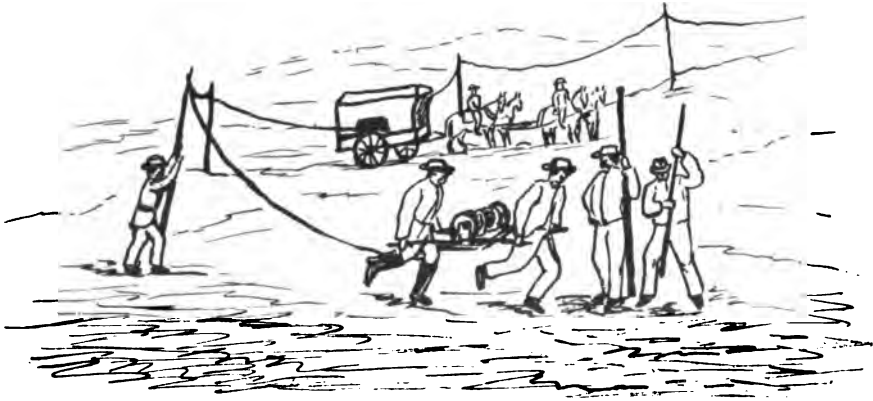


Fig. 15.

Figure 15 shows a battery wagon used as an office and a detachment putting up a line.

Portable telegraph outfits are also transported by pack mules, and there are small instruments that may be carried in a cavalryman's saddle-bags or an infantryman's haversack, so that the reconnaissance parties may tap telegraph lines and take off messages that are passing or communicate with stations.

The "section telegraph train" is the one best suited for college or national guard instruction. Small portable outfits may be secured at small expense and the drill may become very fascinating, particularly for students in electrical engineering courses. Telephones may be used as well as telegraph apparatus under certain conditions of service.

The methods of communication in the U. S. Army comprise the use of flags, torches and heliographs as well as telegraph lines and the *Morse telegraph code, consisting of dots and dashes, is the one used in all the different methods.

U. S. SIGNAL AND TELEGRAPH CODE.

Alphabet.

A . —	F — —	K — — —	P — — — —	U — —
B — — —	G — — —	L — — —	Q — — —	V — — —
C . . .	H — — —	M — — —	R . . .	W — — —
D — — —	I . . .	N — — —	S — — —	X — — —
E . . .	J — — — —	O . . .	T — — —	Y
Z — — — — & — — —				

Numerals.

1 . — — —	3 — — — —	5 — — — —	7 — — — —	9 — — — —
2 — — — —	4 — — — —	6 — — — —	8 — — — —	0 — — — —

Punctuation Marks.

Comma — — —	Interrogation — — — —	Parenthesis Pn
Semicoln Si	Quotation Qn	Brackets Bx
Colon Ko	Paragraph — — — —	Dollar mark Sx
Period — — — —	Exclamation — — — —	Dash Dx
Hyphen Hx	Underline Ux	

NOTE.—A fraction is made by inserting a dot between the numerator and denominator—Example, $\frac{7}{8}$, — — — — —

* See page 119.

Figure 16 shows the manner of using the above code by flags or torches.

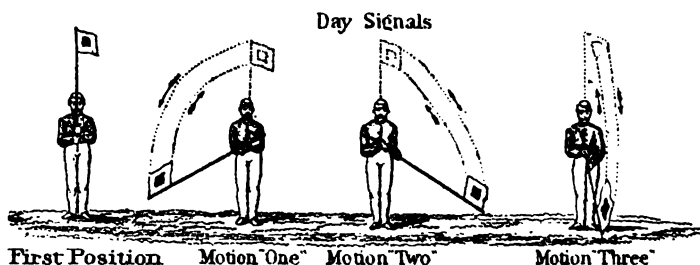


Fig. 16.

Motion one to the right, means a "dot," motion two to the left, a "dash," and motion three to the front, a "space." The torch is waved in the same way as the flag; a torch being placed at the feet of the man to refer the moving torch to, as a centre.

Under favorable conditions of atmosphere and with good telescopes, flag signals have been read twelve miles, but practically flag stations are not more than five miles apart, and torch signals are used about the same distance.

(Flags being used by day and torches at night.)

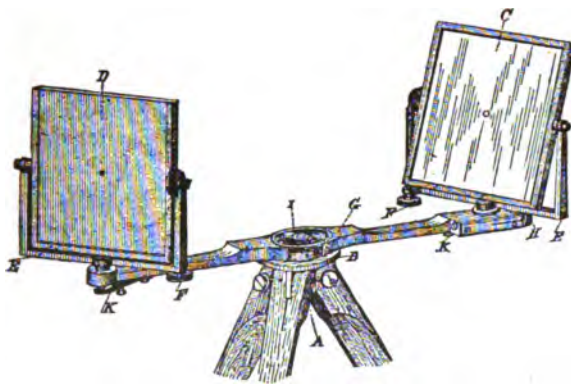
The equipments for one flag and torch station are all packed in one "kit" together to be carried by the soldier mounted or on foot.

For reading flag and torch signals the "field glass" that can be slung by a strap over the shoulder is sufficient, as these have a working range of five miles and under favorable conditions of atmosphere as much as ten miles.

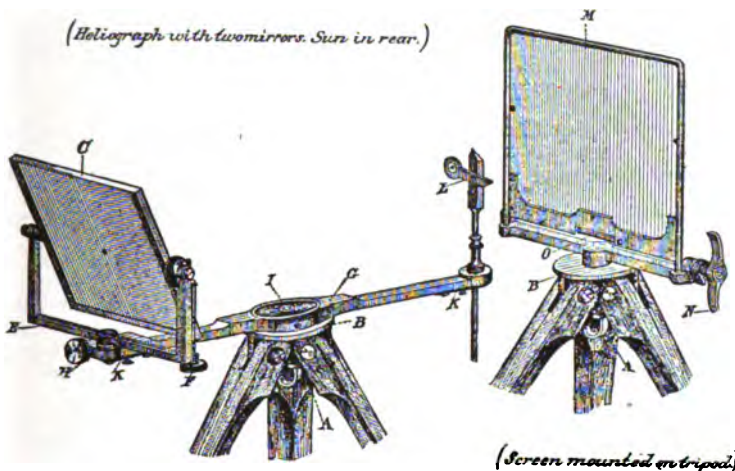
THE HELIOGRAPH.

An instrument called the heliograph, or sun telegraph, constructed with small mirrors made to turn upon both a horizontal and vertical axis, mounted upon a tripod, so arranged as to reflect the sun's rays in any direction, and to make the flashes to appear and disappear in rapid succession is in use in the Army; and by it * messages may be transmitted much faster than with flags or torches, and it can be used at longer ranges. It is manipulated by a key, similar to the electric instrument.

* The flash meaning a "dash" is three times as long as one for a "dot."



(Heliograph with two mirrors. Sun in rear.)



(Screen mounted on tripod.)

(Heliograph with one mirror and sighting rod. Sun in front.)

Fig. 17.

- | | |
|---|--|
| <p>A Tripod.
 B Tripod head.
 C. Sun mirror.
 D Station mirror.
 E Mirror supports.
 F Tangent screw for revolving mirror about horizontal axis.
 G Mirror bar.
 H Tangent screw with ball bearings for revolving mirror about vertical axis.</p> | <p>I Clamp screw for attaching mirror bar to tripod.
 K Spring for clamping mirrors and sighting rod.
 L Sighting rod with movable disk.
 M Screen.
 N Key for screen.
 O Screen spring.</p> |
|---|--|

The range power of the heliograph may be placed at from 25 to 100 miles, in fact it is only limited by the curvature of the earth, and this may be overcome

to some extent by selecting high points for stations. This instrument can, of course, only be used when the sun is shining.

Electric lights are coming into use to some extent as signals, but they have much less range power than sunlight flashes.

Pigeons are used as message carriers and balloon service is also conducted by "Signal Troops."

"Homing Pigeons" and "Military Balloons" will be considered in the next lecture under the heading "Signal Corps."

HOSPITAL CORPS.

All hospital service is performed by members of the hospital corps, who are enlisted for and permanently belong to the Medical Department. In time of war the corps performs the necessary ambulance service under such officers of the medical department as may be detailed for that duty. There should be attached to every military command one medical officer, one hospital steward, and at least three privates of the hospital corps, and the general rule is to allow at the rate of one medical officer, one hospital steward and from two to four privates to each battalion or squadron of the "line" when battalions or squadrons serve together in regiments; cavalry and artillery requiring more than infantry.

For each post of two companies or a regiment, one acting hospital steward is also allowed.

These rules give a surgeon, two assistant surgeons, three hospital stewards, one acting hospital steward, and six privates of the hospital corps to each infantry regiment, and one extra medical officer and one private of the hospital corps are allowed to each brigade and division headquarters. On the march and in battle each medical officer is habitually attended by a mounted private of the hospital corps. Hospital stewards, acting hospital stewards and at least one private of the corps, are mounted when serving in the field and all privates of the corps are mounted when serving with mounted commands.

Four privates of each company, troop or battery of the line are selected by their company commanders, with concurrence of the surgeon, as litter bearers.

They are officially designated "company bearers" and wear the "brassard" around the left arm.

Company bearers and men of the hospital corps are instructed under the supervision of the surgeon of the post, at such times as the commanding officer appoints, in the duties of litter bearers and rendering first aid to the sick and wounded. During an engagement the company bearers, acting under orders of their company commanders and supervision of their regimental surgeons, render aid to their wounded comrades and carry them to the rear. Upon being relieved by members of the Hospital corps they immediately join their companies.

With each regiment there is a temporary hospital used as the first dressing station and for the reception and care of those likely to be but temporarily disabled. The most serious cases are sent by the regimental surgeon back to the field hospital, which is usually located near division headquarters, in some house if practicable, where most of the surgical operations and amputations are performed.

The general hospitals are under the exclusive control of the Surgeon-General, as directed by the Secretary of War. They are permanently located well to the rear of active operations in some city or town and connected with the "front" by railways and waterways.

The Medical Department conducts the transportation of the sick and wounded in the field, even to the extent of having railway trains, boats and transports exclusively under its control.

The "red cross" ambulance is the conventional vehicle for field service.

This has been named from the "red cross" on a white ground that is upon each side of the ambulance,—under provisions of the "Geneva Convention," adopting this as the distinctive insignia for hospitals and ambulances the world over. White flags containing the "red cross" are also used to mark general hospitals and the way to them.

The surgeon and ambulance habitually move at the rear of the command to which they belong.

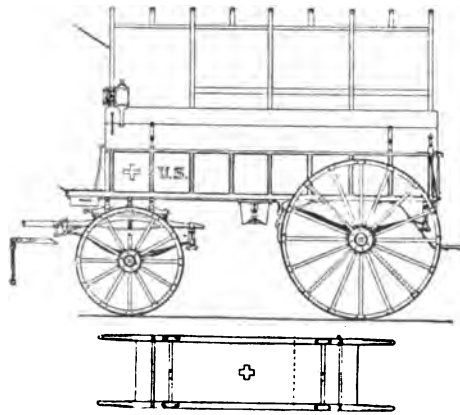


Fig. 17.

Figure 17 shows an ambulance with one of its "litters."

One ambulance goes with each command numbering less than 200 men ; two when the number is greater than 200 but less than 500, and three with a full regiment of three battalions.

In time of war two ambulances go with each corps headquarters, and two army wagons are also allowed to each division train of ambulances.

Travois and mule litters are also used for mountain service.

Privates of the hospital corps are organized into companies with the hospital stewards and acting hospital stewards under the command of the officers of the Medical Department, and these companies in war times habitually camp near the division hospital, from which the "medical director" manages the hospital service, as the exigencies of battle require.

Members of the hospital corps are not required to perform military duties other than those pertaining to their corps ; though they are instructed in such drill, both foot and mounted, as is necessary for their service.

WAGON TRAINS.

An army *corps having an aggregate strength of 43,191 officers and men and 120 guns, requires 1,306 carriages other than gun carriages, and a total of

*Page 15.

11,770 animals; and these proportions embody the general rule in army organizations--“about one animal to each four soldiers.”

As has been seen in the foregoing tables, field transportation is made up principally of 6-mule wagons. Each of these carry, over all kinds of roads, about *2500 pounds besides the forage for the team for five days.

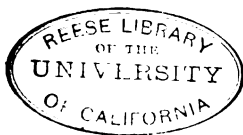


Fig. 18.

Figure 18 illustrates the conventional “6-mule team” hitched to an army wagon ready to “pull out” into its place in the train. In the United States mules are used in preference to horses for field transportation.

The team of 6-mules is managed by one driver, who rides the near wheel mule and controls the team by one line called “a jerk line” running to the near ring of the bit of the near lead mule, called the “line mule,” the off lead mule being connected with the line mule by a “jockey stick” running from the bit of the off mule to the hames of the line mule. The line mule is very carefully trained so that by pulling steadily on the line the team wheels to the left, while by jerking the line the team wheels to the right. The army wagon is rigged with six bows over which a canvas cover is drawn tightly so that supplies need never get wet. The army wagon is staunch, short coupled and rigged with a brake, which is worked by the driver from his seat on the wheel mule, by means of a strap running to a lever near the hind wheel. Spare poles, reaches and other parts are carried on each wagon, and each 6-mule team with its wagon and

*4000 pounds over good roads.



driver is complete by itself, so that one may be sent off alone or any number put together to make up a train.

Each train of 25 wagons is in charge of a wagon master, who has under him two assistant wagon masters.

The wagons of the same train form in one or two columns according to the nature of the country over which they move.

In large commands separate trains of wagons must be provided for ammunition for infantry, cavalry and artillery, for forage, for rations and for baggage. These wagon trains are divided into two general classes—the advance or “division trains” and reserve or “corps trains.” The former carry such supplies of ammunition, forage, rations and baggage as may be needed at once, and must accompany the troops, while the corps or reserve trains move in rear of the army as feeders to the advance trains.

Commanders generally indicate the route which the wagons will take. As a rule, they are directed not to interfere with the movements of the troops, and when they come in contact with troops or ambulances, they are habitually required to yield. It is, however, sometimes directed that troops shall take the sides of the road—as was the case for Sherman’s army on the great “*march to the sea*”—for the reason that they can better march off the road than the wagons can, and are on hand to assist the wagons in case of need. Proper escorts are regularly detailed to guard the trains, their size depending upon the likelihood of being attacked by the enemy.

Pack trains are organized for service where there are no roads, and over mountain trails where it is impracticable for wagons to go.

Sufficient transportation must be furnished so that the infantry and cavalry can at all times have 200 rounds of cartridges per man. (100 rounds in belts, 36 rounds in the regimental ammunition wagons and 64 rounds in the reserve column.)

Each field battery requires 273 rounds per gun. (42 in each limber, 189 per gun in the caissons with the battery, and 42 rounds per gun in the ammunition column.)

In addition to ammunition supplies the corps train should carry five days' supply of rations and forage; however, if forage can be secured in the theatre of operations, only one day's forage need be carried by the train.

Baggage wagons for the several headquarters are allowed as follows : One 6-mule wagon for regimental headquarters ; two 6-mule wagons for brigade headquarters ; three 6-mule wagons for division headquarters, and six 6-mule wagons for corps headquarters.

Roughly estimated, 1,000 rounds of rifle cartridges weigh *100 lbs. ; light artillery ammunition 18 lbs. per round ; and one ration, 4 lbs. gross. The full forage ration is 14 lbs. of hay per animal, 12 lbs. of grain per horse, and 9 lbs. of grain per mule. Hay, however, is rarely carried with a train ; the animals are usually grazed or hay procured *en route*.

HORSE DEPOT.

Each corps requires a depot containing at least 100 horses and 100 mules, from which losses may be quickly supplied.

QUARTERMASTER'S EMPLOYEES.

In European armies there are enlisted troops for service as teamsters, and with wagon trains, railroads, etc. ; but in the United States this service is usually performed by "civilian employees," or by detailing men from the "line" on extra duty in the quartermaster department. The latter practice is not a good one, as it depletes the effective strength of the line or fighting force, and the quartermaster department needs an organized force within itself for the sake of better discipline.

VETERINARY SURGEONS.

One veterinary surgeon, with the pay of \$75 per month, is allowed to each of the cavalry regiments, and to each of the seventh, eighth, ninth and tenth regiments of the regular army an additional veterinary surgeon at \$100 per month is allowed. These veterinary surgeons are not included in the organization table

*New model for magazine guns, 76 lbs.

of the army. They are appointed by the Secretary of War; have the relative rank of sergeant-major and are entitled to the same allowances of quarters, fuel and lights. They have no uniform prescribed by regulations and in many respects are viewed as civilian employees similarly to "contract surgeons" employed in the medical department of the army.

CLERKS AND MESSENGERS.

The clerks and messengers are employed and apportioned to the several military *headquarters by the Secretary of War; they are viewed as civilian employees. Clerks of the first class receive \$1,000 per annum; of the second class \$1,100 per annum; of the third class, \$1,200 per annum; and messengers \$60 per month.

INDIAN SCOUTS.

Indian Scouts to the number of 40 are authorized to be enlisted, within the strength of the regular army (25,000 men.) They are enlisted for six months and receive the same pay and allowances as cavalry soldiers while so serving, and in addition forty cents per day for their horses.

Our force of scouts is now used principally for guides and trailers, and distributed around to posts in the Indian country in small detachments. The practice of employing friendly Indians as allies for white troops has come down to us from the earliest Colonial days, and the success of our most famous Indian fighters has been due largely to their skill in using friendly Indians as allies with a sufficient force of cavalry to control and support them. We have, from time to time, had larger forces of these scouts organized into companies under officers detailed from the army, and the same practice would again be pursued in a general Indian campaign.

Routine Duty within a Regiment.

THE COMPANY, TROOP AND BATTERY.

The company in infantry, the troop in cavalry and the battery in artillery constitute the smallest tactical units in their respective arm of the service, and the

*Pages 14 and 15.



captain of each is both its governing and administrative head. He procures for his men clothing and camp and garrison equipage from the quartermaster of the regiment or post to which his company, troop or battery belongs, rations from the commissary, and arms, ammunition, and equipments from the ordnance department, and for all of these he becomes personally responsible to the government. The German soldiers call their captain the "Company Father" and he watches over his company much as a father does over his family.

Lieutenants are the captain's assistants, and in case of his absence or sickness the senior in rank takes the captain's place. They should have access to the records and returns of the company, and be familiar with them that they may know what to do when the captain is suddenly called away. The company should be permanently divided into platoons, each under the supervision of a lieutenant.

The first sergeant is appointed from the sergeants of the company, troop or battery by the captain; and in an illustrative sense, he is the company foreman. All orders to the company affecting administration or discipline are executed through him, whether given by the captain or one of the lieutenants. He is the immediate custodian of the property for which the captain is responsible to the government, and assisted by one of the men detailed as "company clerk" keeps the rosters and records of the company. He lives with the company, but in a room or tent apart from the rest of the men, and is usually given power to arrest men of the company for disturbance, reporting immediately thereafter to one of the company officers for confirmation of the act, as only commissioned officers can exercise the constructive power of arrest; the other sergeants are assistants to the first sergeant, each having charge of one of the sections into which the men of the company are usually divided. Each corporal usually has charge of a squad, which is a subdivision of the section.

The "Drill Regulations" govern all tactical formations and movements, and the captain is held responsible that all within his company know and perform their duties as prescribed therein. He should not attempt to perform the details

of service, but prepare and supervise such a system of discipline that each person under his command can be held accountable for his part, and no company discipline can be considered complete or efficient unless it be such that any two privates coming together for duty clearly understand which one has authority over the other.

During six months of the year, from October to March, non-commissioned officers' schools should be held semi-weekly, conducted by one of the lieutenants, as directed by the captain; and theoretical instruction should in turn be imparted to the privates by the chiefs of sections or squads under supervision of lieutenants, each of which would supervise instruction in his own platoon.

The companies, troops and batteries in each regiment are designated by the letters of the alphabet beginning with A and omitting J, *e. g.*, "Company A 3d Infantry," "Troop B 4th Cavalry," "Battery M 5th Artillery."

Articles of public property issued to a company should be marked with the letter of the company and number and arm of the regiment. Haversacks and blanket bags will be uniformly marked on the outside as follows: Cavalry, crossed sabers; artillery, crossed cannons; infantry, crossed rifles; with letter of company above and number of regiment below the intersection; the special corps of the Army according to their respective devices. The canteen will be marked with the letter of the company, number of the regiment, and number of the man.

The returns and muster rolls are made out in the name of the captain whether he be present or absent.

Each morning after breakfast, the barracks or tents and grounds around them are thoroughly cleaned by police details. Usually the old guard constitutes the police detail for the day after it marches off guard. At "sick call," which is sounded at an hour in the morning fixed by the post or camp commander, the *first sergeant marches the sick of the company to the hospital for treatment, taking with him the sick book, each page of which is prepared for one day, in form as follows:

*The First Sergeant may send another non-commissioned officer as "sick marcher."

Sick Report of Company "A" 4th Regiment of U. S. Infantry, May 20, 1895.

ENTRIES TO BE MADE BY THE FIRST SERGEANT.					SURGEON'S REMARKS.			
Name of Patient.	Rank.	Date when taken sick.	No. of times reported sick by the Surgeon during the year.	No. of days on sick report during the year.	Disease. (If feigned so state.)	Whether sick in Quarters or in Hospital.	Of what Duty Capable when sick in quarters.	When Returned to duty.
Henry Brown.....	Pvt.	May 1, '95	19	19	Catarrh	Hospital.	.....	.....
Wm. Smith.....	Corp.	" 15, "	5	10	Piles.....	Duty,	.....	May 20, '95
Eben Jonson.....	Pvt.	" 20, "	.....	.....	Tonsilitis .....	.....	Qrs.	.....
Samuel White.....	"	" 20, "	.....	.....	Pneumonia	Hospital,	.....	.....
Rufus Rangle.....	"	" 20, "	.....	.....	Sore throat.....	Duty,	.....	May 20, '95

*I certify that I have carefully examined the above report.

JOHN JONES,
Captain Company "A."

J. S. WALKER,
Asst. Surg. U. S. A.,
Attending Surgeon.

After returning from sick call, the first sergeant makes up the company morning report, signs it, takes it to the captain for his signature, and then to the adjutant's office before eight o'clock A. M., or such hour as may be designated in post orders.

This report is made out in a book having a page for each day, and on a form furnished by the adjutant-general of the army, alike for all companies, so that a consolidated report can be made up at the adjutant's office.

All passes for the day for enlisted men go in with the morning report book in the following form :

*The examination may be made and the list signed by any Commissioned officer of the Company.

<i>1st Sergeant Co. A, 4th Inf.</i> <i>CHARLES MAYER,</i>	FORT RILEY, KAN., May 20, 1895.
	Private Wm. F. PRESCOTT, Co. A, 4th Inf., has permission to be absent from the garrison from 4 o'clock P. M., 20th inst, until 9 o'clock A. M., 21st inst.
	Approved JOHN JONES,
	By order of Col. ANDERSON; <i>Capt. 4th Inf., Com'g Co. "A"</i>
	CHAS. F. STOWE, <i>1st Lt. & Adj't 4th Inf. Post Adjutant.</i>

No soldier can absent himself from the camp or garrison beyond the sound of the trumpet calls or chain of sentinels without a pass signed in the above form. Officers must also secure verbal permission from the "commanding officer" to so absent themselves; the lieutenants first securing their captain's permission.

At 12 o'clock M, or such hour as may be fixed by the commanding officer of the post or camp, "first sergeant's call" is sounded, at which each first sergeant repairs to headquarters and gets back his morning report book with the orders for the day, which he immediately takes to his captain who issues the necessary instructions for their execution.

The sergeants and corporals of the company, troop or battery are appointed by the colonel (or commanding officer) of the regiment upon recommendation of the captain, (or company commander). Each sergeant and corporal receives a warrant signed by the colonel, and they can only be reduced by expiration of term of service; by the colonel or by the sentence of a court martial.

They should be supported by all superior officers in their authority, except when it is improperly and unjustly exercised, and as a rule they should not be reproved in the presence of their juniors in rank.

The positions next below corporal are, in a troop of cavalry, trumpeters, farriers and blacksmiths and saddler; in a battery of artillery or company of infantry, musicians (either trumpeters or drummers and fifers) and artificers. These are enlisted for the positions, or may be appointed by the captains. Company, troop or battery commanders may also appoint one wagoner who drives the team assigned to a company for police and other service. All other soldiers in a company are officially designated "privates." Captains appoint "lance-

corporals" when the number of corporals present for duty does not meet the requirements of the service, but they are simply acting corporals without increased pay.

The record books of the company, troop or battery are as follows: Letters sent and letters received with index books for each, sick-book, record of vaccination, company clothing-book, morning report-book, descriptive-books for officers, men and animals, company fund book, target record-book, record of property issued book of rosters and an order book.

Besides these books such returns must be made as are required by regulations and orders.

Blank forms for all these records and returns are furnished by the bureaus to which they pertain, and detailed instructions concerning them are printed thereon.

Strict attention should be paid to police and sanitary regulations by commanders of companies, troops, batteries, bands and detachments. They should make daily inspections of men's barracks or tents and kitchens, and hold chiefs of squads responsible for the cleanliness of their men; that they bathe frequently, keep their hair short, beard neatly trimmed, and arms, accoutrement and clothing in good condition.

Once each week inspection should be held, under arms, from which no one is excused, except the guard and the sick in hospitals, and for this inspection bunks and bedding should be overhauled, floors, tables and benches scoured, and articles of black leather polished as well as arms and accoutrements cleaned.

Particular attention must be paid to cooking and messing. The *company kitchen should be placed under the immediate charge of a non-commissioned officer, and a suitable number of men fully instructed in the art of cooking, and every soldier sufficiently so instructed that he can cook his own rations when detached.

By due economy in company messing some parts of the rations can be saved and sold, and a fund created with which to provide additional articles of diet. A

*Company is here used in a general sense, including troops, batteries and bands.

company fund account must be kept with vouchers for each expenditure, and, quarterly, a "company council" convened consisting of all company officers present, to audit the accounts, and their proceedings should be recorded in an appropriate book.

In the proceedings of company councils the regimental or post commander decides disagreements.

The subject of rations and field cooking will be considered in detail in the succeeding chapter under the head "Subsistence Department."

When a company, troop or battery serves alone, the captain becomes the "commanding officer" in the technical sense of regulations with enlarged powers, and organizes a staff by appointing one of his lieutenants, adjutant, and the other quartermaster, and commissary. He will also be furnished with a medical officer as post or camp surgeon, and one hospital steward, and three privates of the hospital corps would be assigned to his command. He would detail one of the sergeants of his company to act as sergeant-major, and unless there be supplied from the respective staff departments a commissary sergeant and post quartermaster sergeant, he also details sergeants or corporals from his company to act in these capacities, and his command would in all respects be organized for administrative purposes the same as the larger commands composed of several companies, troops or batteries.

THE BATTALION OR SQUADRON.

As has been previously indicated, in infantry and artillery the command next larger than a company or battery is the battalion, and in cavalry the squadron. The battalion or squadron is commanded by a major, or by the senior captain present, who appoints one of the lieutenants belonging to his command as adjutant, and one of the sergeants as sergeant-major. When several battalions or squadrons serve together, as parts of larger commands, they are tactical rather than administrative organizations, and the battalion or squadron commander may or may not appoint other staff and non-commissioned staff officers as circumstances require. When the battalion or squadron serves as a separate

command, a battalion quartermaster and commissary, and other administrative positions, would be filled as indicated in the previous articles for a company serving separately, only on a scale commensurate with the increased size of the command and demands of the service. The necessary men would be detailed from the companies, proportionately, for clerks and assistants in the adjutant's office, and in the quartermaster's and commissary departments. In fact, the separate battalion or squadron commander would have a staff organized practically as for a regiment.

REGIMENT.

The regiment is both a tactical and administrative organization, and when all of the companies of a regiment serve together they will be comprised in three battalions or squadrons, and each regiment would have a band made up as hereafter specified under the head of "band and field music."

While the new "Drill Regulations" prescribe the same three battalion organization for infantry as for cavalry and artillery as indicated above, congressional legislation is behind in actually providing for this organization, so that at the present time a United States "regular" infantry regiment* contains but one major and ten companies. However, as the *Tactics* call for this formation, legislation will undoubtedly soon meet the tactical requirements.

The field and staff officers are all mounted except chaplains. They must each own two horses, but the government supplies them forage. This rule is general for all mounted officers.

In time of peace two of the batteries in each regiment of artillery are armed and equipped as light batteries; the remainder of the regiment perform duty as infantry, and in addition manœuvre the heavy artillery in the sea coast fortifications.

Officers' schools or lyceums are conducted by the colonel or one of the field officers, at least twice a week, from October 1 to March 31 of each year, for which the colonel prescribes the course and methods of instruction.

* "Peace footing."

FIELD OFFICERS.

The *colonel* commands the regiment and is assisted by the lieutenant-colonel, who occupies a position in the regiment analogous to that of a lieutenant in a company.

The majors, in addition to their duties as immediate commanders of their battalions or squadrons, are also assistants to the colonel.

The colonel, lieutenant-colonel and majors are styled "*field officers*," and in their order of rank the lieutenant-colonel and majors become *regimental commander* in the absence of those senior to themselves.

REGIMENTAL STAFF.

The colonel (or regimental commander) appoints from the lieutenants of the regiment an adjutant and quartermaster (the latter subject to the approval of the Secretary of War). These are extra lieutenants and do not belong to companies, troops or battalions.

In time of war each regimental organization would include a surgeon, two assistant surgeons, a commissary and chaplain.

DUTIES OF REGIMENTAL ADJUTANT.

The adjutant, under direction of the regimental commander, has charge of the various rosters of the service; he makes, publishes and verifies all details; keeps the records of the regiment and performs such military duties with troops as are required by tactics and regulations. The adjutant should be courteous to, and on friendly terms with, the officers of the command he represents, and should avoid all discussions of the orders or military conduct of his superiors. He should inform himself upon all points of military usage and etiquette. He should endeavor, at all times, to exert the influence belonging to his station, in sustaining the reputation, discipline and harmony of the regiment.

All official communications coming from officers within the regiment and requiring the action of the regimental commander are addressed to the Adjutant, and he signs all orders and communications going to those officers by order of

the colonel or regimental commander. He is also in direct command of the band as a captain is of each company.

DUTIES OF REGIMENTAL QUARTERMASTER.

The duties of quartermaster require business qualifications. He receives his orders usually direct from his colonel, though written orders affecting his duties should be signed by the adjutant, and he should address official communications intended for the action of the commanding officer to the adjutant. He has no power to issue orders, except when acting as adjutant, or to his own employees. In the absence of the adjutant he performs his duties and *vice versa*, the adjutant takes his duties in his absence. He has charge of all Q. M. property belonging to the regiment, and in addition is usually Post Quartermaster when the regimental commander may be in command.

He supplies clothing, camp and garrison equipage, fuel, stationery, forage, transportation, quarters, etc., upon requisition from the captains approved by his "commanding officer," and in turn keeps his storehouse supplied by timely requisitions upon the chief quartermaster of the department or next higher command, and he manages the "trains" and means of transportation pertaining to the regiment or command for which he is quartermaster.

COMMISSARY.

When the regiment is serving separately or at a post commanded by the regimental commander, he appoints some lieutenant of the regiment commissary, if no officer of the subsistence department be assigned, and the "commissary" supplies rations for the men and groceries for sale to officers and men, in a similar manner to which quartermaster's stores are supplied by the quartermaster.

SURGEON AND ASSISTANT SURGEONS.

At regimental headquarters there is usually detailed at least one surgeon (major) and one or more assistant surgeons (captains or lieutenants) whose duties are to manage the hospital and treat the sick and wounded, supply medi-

cines by timely requisitions upon medical depots, conduct the ambulance service, and advise the commander concerning hygienic measures.

CHAPLAIN.

The four colored regiments of the regular army have regimental chaplains, but in time of peace the other regimental headquarters are usually supplied by details from the *post chaplains.

NON-COMMISSIONED STAFF.

The regimental staff officers are assisted in their duties by the non-commissioned staff, as captains are by the first sergeants; the adjutant by the *sergeant-major*; the quartermaster by the *quartermaster-sergeant*; the commissary by the *commissary-sergeant*; and the surgeons by three hospital stewards. The non-commissioned staff officers are in turn assisted by men detailed from the companies on extra or daily duty, and by fatigue details as ordered from the adjutant's office, day by day. The hospital attendants are regularly enlisted men of the hospital corps. One or more hospital matrons are allowed to each post-hospital for doing the laundry work.

BAND.

A good military band is an essential part of each regimental organization.

One chief musician is authorized by law for each regiment of cavalry, artillery and infantry, and the commanding officer of each regiment is authorized to detail from the companies of his regiment, one sergeant and sixteen privates, in addition to the chief musician, to constitute a regimental band.

The musicians of the band are for the time being dropped from company muster-rolls and mustered in a separate squad under the chief musician, though they are instructed as soldiers and liable to serve in the ranks of companies if occasion requires.

* See organization table page 6.

The chief musician is the "leader" and musical director of the band.

Bands wear the general uniform of their regiments, though regimental commanders are authorized to add such ornaments as they deem proper.

Bands of cavalry regiments are mounted, and provided with instruments adapted to use on horseback.

FIELD MUSIC.

One chief trumpeter is authorized by law in each regiment of cavalry, and two principal musicians in each regiment of artillery and infantry. These belong to the non-commissioned staff of the regiment, and each company troop or battery has two enlisted musicians, usually trumpeters. These non-commissioned staff officers and company musicians constitute what is termed the "field music" of the regiment. The company musicians serve with their respective companies, but when their companies are serving at regimental headquarters, they march in rear of the band upon all occasions of ceremony, and, under the leadership and direction of the chief trumpeter (in cavalry) or a principal musician (in infantry and artillery) supply the place of the band, when the band does not appear.

Musicians of light artillery battery are furnished by the quartermaster's department, with small brass Bb bugles, and all other troops with G trumpets with F slides, and if desirable, detachable F crooks.

Foot troops may, if desirable, use the drum and fife in place of the trumpet.

When the field music is by itself and using the drum and fife, the fifers are placed in front of the drummers. In the company the fifer is on the right of the drummer.

DRUM MAJOR.

The grade of drum-major does not appear in the organization table of the U. S. Army, and consequently no uniform is prescribed in army regulations for a drum-major.

Either the chief trumpeter, one of the principal musicians, a sergeant of the band, or such non-commissioned officer as the regimental commander designates,

customarily fills the position of drum-major, prescribed in Drill Regulations, and the non-commissioned officer acting in this position, consequently wears the uniform of his proper grade. Regimental commanders are authorized to add such ornaments to the band uniform as they deem proper, and the drum-major's uniform is usually made to contrast somewhat with that of the band.

The bear-skin hat is the conventional head dress. He is armed with the non-commissioned staff officer's sword, and on parade and occasions of ceremony carries a staff called a "Baton," with which he gives the conventional signals, to the band, prescribed in Drill Regulations.

The person selected for drum-major should be of good military figure, of commanding presence and experienced in military drill. Though he need not necessarily be a musician he should have a "correct ear," as he beats time for the band with his staff.

From the time the band leaves the band-room until its return and dismissal he has full charge of its movements. The leader selects the pieces to be played, but waits the proper signal from the drum-major to play and to cease playing.

Conversation in ranks is to be avoided, and musicians should keep their position with soldier-like attention, as though they were in the ranks of a company.

When required to play at a funeral, the band should march to a point near the remains without music.* While the body is being removed to the hearse something appropriate should be played: Pleyel's Hymn, or music of this order. While marching at the head of the column in the procession, funeral marches should be played until arriving at the cemetery entrance, when the band should open order and cease playing until the procession passes through. After the services at the cemetery have concluded the band should resume their position at the head of the column, returning from the cemetery, and immediately play some quick march. It is well to make selection of marches that are not very common, otherwise they might seem incongruous.

*Farrow's Military Cyclopædia.

FLAGS, COLORS, STANDARDS AND GUIDONS.

FLAGS.

Every military post, arsenal or permanent camp must fly a "national flag" made of bunting, having 13 horizontal stripes, 7 red and 6 white, red and white stripes alternating. The "union" of the flag occupies the upper quarter next the staff, and extends to the lower edge of the fourth red stripe from the top. The number of the stars is the same as the number of States of the Union; a star being added for each new State on the 4th day of July next succeeding its admission.

There are three sizes of these flags, the "garrison flag" 36 ft. fly by 20 ft. hoist, to be hoisted only on holidays and important occasions; the "post flag" 20 ft. fly by 10 ft. hoist, for habitual use in pleasant weather; and the "storm flag" 8 ft. fly by 4 ft. 2 in. hoist, to be used in stormy or windy weather.

COLORS AND STANDARDS.

Each regiment of infantry or artillery and the engineer battalion carry two silken flags called "colors," 5 ft. 6 in. fly by 4 ft. 4 in. on the pike; one of these flags to be the "national color" and the other a "regimental (or battalion) color;" blue for infantry and scarlet for artillery and engineers.

Each cavalry regiment carries a silken standard "national color" 4 ft. fly and 3 ft. on the lance, and also a regimental standard of yellow silk of the same size.

The silken national color or standard is carried in battle, campaign and on all occasions of ceremony at regimental headquarters in which two or more companies of the regiment participate. The regimental color or standard is carried in like cases in battle, campaign and at reviews and inspections. At ceremonies other than reviews, inspections and escort of the color, it will be carried only when so ordered by the regimental commander. A similar rule applies to the use of the color of the battalion of engineers.

The national or regimental *color or standard, uncased, passing a guard or other armed body will be saluted, the field music sounding "to the color" or "to the standard." Officers or enlisted men passing the uncased color or standard will render the prescribed salute; with no arms in hand, the salute will be made by uncovering.

The colonel selects the most soldierly, reliable, "duty sergeant" of the regiment as the "national color bearer," and another possessing similar qualities to carry the "regimental color." Two experienced soldiers are also selected by the colonel to complete the color guard.

The sergeant carrying the national color is in command of the "color guard" and requires respect to be paid the colors on all occasions, when under guard.

The color, kept at the office or quarters of the colonel, is escorted by the color guard, marching in one rank, the color bearer in the center, to the color company on its parade ground; and in like manner back to its place of deposit.

The color guard, at the command of the color bearer, presents arms on receiving and on parting with the color; in the latter case, the color guard returns to the carry at the command of the senior member of the guard.

*GUIDONS.

Each troop of cavalry and light battery of artillery has a silken guidon cut swallow-tail, 15 in. to fork, 3 ft. 5 in. from lance to swallow-tail, and 2 ft. 3 in. on the lance.

CAMP COLORS.

Six bunting "national flags," 18x20 in. on poles of ash 8 ft. long and 1 1/8 in. in diameter, and the butt end armed with a pointed ferule, should be kept at regimental headquarters for use at ceremonies to mark alignments and points for changing direction.

* "Service" colors, standards and guidons made of bunting are also provided, see par. 220, 221, U. S. Army Regulations.

CHAPTER III.

The Staff Departments.

In the *organization of the United States Army, immediately following "general officers," there appear the several sub-divisions comprising "the staff," viz: military secretary, aides-de-camp to general officers, adjutant-general's department, inspector-general's department, judge advocate general's department, quartermaster's department, subsistence department, medical department, pay department, corps of engineers, ordnance department, signal corps and post chaplains.

The functions of these staff officers and departments have heretofore been but briefly defined, and it is the purpose of this chapter to outline the organization and sphere of duty within these several departments, at the Military Academy at West Point, and at schools and colleges having military departments managed by officers of the Army.

MILITARY SECRETARY.

When the grade of lieutenant-general is filled, such officer may select from the army one officer to serve as his "military secretary," who ranks as lieutenant-colonel of cavalry, while so serving. This, however, is but a temporary appointment and when the officer is relieved from the duty, he reverts to his grade in his arm or department of the service.

AIDES-DE-CAMP TO GENERAL OFFICERS.

When the position of general is filled, such officer may select from the army six officers to serve as aides-de-camp, who shall have the rank of colonel of cavalry while so serving. A lieutenant-general may, in addition to his military

*Chapter I, page 6.

secretary, select two officers of the army to act as aides-de-camp, who hold the rank of lieutenant-colonel of cavalry while so serving. Each major-general may select three aides from the captains or lieutenants of the army, and each *brigadier-general may select two aides from the lieutenants of the army. These aides-de-camp, like the military secretary, are only temporarily detailed and do not increase the strength of the army. Their duties are of a confidential nature and cannot be well defined. In time of war they become very important officers, and should possess professional skill and training of the highest order. They are not only charged with transmitting orders of the chief, but are often called upon to issue orders in his name, without opportunity for previous consultation with him, and must consequently have a full and accurate knowledge of the intentions of the chief, and an understanding of the plan of campaign in detail.

ADJUTANT-GENERAL'S DEPARTMENT.

This is the department of *correspondence, orders and records*, and embraces the *bureau of military information*.

All general orders which emanate from the War Department or the Headquarters of the Army; the orders of detail, of instruction, or movement, and all general regulations for the Army, are communicated to the troops through the office of the adjutant-general.

The record of all military appointments, promotions, resignations, deaths and other casualties; the registry of all commissioned officers; the filling up and distribution of their commissions, and the preparation and issue of the army register, pertain to the adjutant-general's office.

The adjutant-general's office is the repository for the records of the War Department which relate to the *personnel* of the military establishment, and to the military history of every commissioned officer and soldier of the regular and volunteer forces in the service of the United States.

*The heads of staff departments ranking as brigadier-generals are not entitled to aides.

In this office the recruiting service is conducted ; the names of all enlisted soldiers are enrolled, their enlistments and descriptive lists are entered, and all deaths, discharges, desertions, etc., are recorded.

In this office the general returns of the army are consolidated ; the monthly returns of the regiments and posts and the muster rolls of companies are preserved ; the inventories of the effects of deceased officers and soldiers are entered, and the annual returns of the militia, required by law to be submitted to congress, are prepared.

Besides the Adjutant-General of the Army who ranks as brigadier-general and is the chief of the bureau in Washington, there are four colonels, six lieutenant-colonels and five majors styled "assistant adjutant-generals." In time of peace these "assistants" are detailed on duty at the headquarters of the various military departments, and in time of war every brigade, division corps or separate army has its assistant adjutant-general, and when there are not enough officers properly belonging to the adjutant-general's department to supply all these organizations, "line" officers are detailed for this duty, styled "acting assistant adjutant-generals," and their position and duties within the brigades, divisions, corps, and separate armies with which they are serving, correspond to those of the adjutant-general of the army. All correspondence within a command, whether between staff departments or between line and staff, passes through the adjutant-general or acting adjutant-general. He must consequently keep fully informed of the condition and details of every other department within the command, and is the chief of staff of the commanding general under whom he is serving.

CORRESPONDENCE.

Official letters should, in general, refer to one subject only. Communications of not more than a single page in length should be transmitted on a half sheet of *letter paper, and occupy the center of the page. When more than three pages of the sheet are required for the body of the communication, an additional half sheet or more, if necessary, will be neatly pasted to it, so that the last or outer page may be left entirely blank.

*Official letter paper is 10 inches high by 8 inches wide.

Official communications will be signed or authenticated with the pen. Signatures will be plainly and legibly written with the rank and regiment or corps of the writer annexed; if "by order," stating by whose order.

Letter paper will be folded in three, and legal cap in four, equal folds, parallel with the writing. The inner or left hand edge of the sheet is the top when folded. The left hand fold of the outer page is the first fold. The first fold will be used, exclusively, for a brief analysis of the contents of the communication, office marks, and noting of inclosures.

A letter should be "briefed" at the first office at which received, and previous to putting upon it the first endorsement.

Endorsements commence at the top of the second fold and are serially numbered, following each other in order of date on the successive folds, leaving room after each for office marks. Additional space for endorsements will be provided by pasting slips of paper on the under side of the last fold, each slip to correspond in length and width, when attached, with the length and width of the original fold, and to turn back upon the last fold like the leaf of a book. By this arrangement the first fold, on which the office marks and brief are made, is always outside.

(Model form for letters in general.)

CAMP SHERIDAN, VT., April 4, 1895.

To the

ASST. ADJUTANT GENERAL,
DEPARTMENT OF THE ATLANTIC.
(Through military channels.)

SIR :

I have the honor to apply for one month's leave of absence, to take effect April 7th, 1895. My last leave of absence expired January 1st, 1894.

Very respectfully,

Your obedient servant,

JOHN H. BROWN,
Second Lieut. 26th Infantry.

(Form for briefing and endorsements on above letter.)

(1st Fold.)	(2d Fold.)	(3d Fold.)
CAMP SHERIDAN, VT., April 4, 1895.	<p>FIRST ENDORSEMENT.</p> <p>Co. "A," 26th INFANTRY. CAMP SHERIDAN, VT. April 4, 1895.</p> <p>Respectfully forwarded to the Regimental Adjutant, 26th Inf'y, approved.</p> <p>H. A. SMITH, Captain 26th Infantry, Commanding Co. "A."</p>	<p>FOURTH ENDORSEMENT.</p> <p>HEADQ'RS. 26th INFANTRY, CAMP SHERIDAN, VT. April 6th, 1895.</p> <p>Respectfully returned through Comd'g Officer Co. "A," 26th Inf'y., inviting attention to the 3d endorsement.</p> <p>By order of Col. Spencer. H. E. ADAMS, 1st Lt. & Adj't. 26th Inf'y.</p>
BROWN, JOHN H. Second Lieut. 26th Inf'y.	<p>SECOND ENDORSEMENT.</p> <p>H'C'Q'RS. 26th INFANTRY, CAMP SHERIDAN, VT. April 5, 1895.</p> <p>Respectfully forwarded to the Asst. Adj't. General, Depart- ment of the Atlantic, approved.</p> <p>JOHN A. SPENCER, Colonel Com'dg 26th Inf'y.</p>	<p>FIFTH ENDORSEMENT.</p> <p>Co. "A," 26th INFANTRY, CAMP SHERIDAN, VT. April 6, 1895.</p> <p>Respectfully returned to Lt. Brown.</p> <p>H. A. SMITH, Capt. 26th Inf'y. Comdg. Co. A.</p>
Applies for leave of absence for one month, from April 7, 1895.	<p>THIRD ENDORSEMENT.</p> <p>H'D'Q'RS DEPT. OF THE ATLANTIC, NEW YORK CITY. April 6, 1895.</p> <p>Respectfully returned to the Commanding Officer, 26th In- fantry, disapproved. The exi- gencies of the service do not allow leaves of absence, at this time.</p> <p>By order of Brig. Gen. Scott. R. A. FOSS, Asst. Adj't. General.</p>	

Communications from an inferior to a superior officer, or vice versa, as a rule, pass through the intermediate commanders. Communications from superiors to inferiors are answered through the same channels as received.

Official communications from a commander to those under his command are signed by staff officers. In all other cases by the commander himself.

Communications to the Secretary of War or Commanding General of the Army should be addressed to the Adjutant General of the Army through intermediate commanders.

When addressing a communication the rank of the officer should precede his name, e. g. "Captain John H. Jones, 1st U. S. Infantry."

In signing an official communication the name is written on one line and on the next line below the rank and regiment are given, e. g. "John H. Jones, Captain 1st U. S. Infantry."

"Official Business" should be printed or written on the upper left hand corner of an envelope.

A copy of every letter and endorsement sent should be kept in a book known as "letters sent book," and there should also be a "letters received book" for recording communications received, which should become a part of permanent records; and there should be an index to each of these books.

BOARDS.

Proceedings of "boards" should be written on legal cap paper and sent by the recorder in an official envelope, addressed to the adjutant general or adjutant to the commander by whose order the board was convened.

(Model for proceedings of a board of survey.)

Proceedings of a board of survey, convened at Fort.
by virtue of the following order:*

Fort.,

....., 189 , o'clock, .. m.

The board met pursuant to the foregoing order. Present: all the members. The board then proceeded to the business before it, and after a careful consideration of the evidence contained in the affidavits of.....
....., and..... hereto appended and marked A and B respectively, and other evidence submitted to the board, finds that.....
The board therefore recommends that
There being no further business before it, the board adjourned *sine die*.

(Signature) .. .,

(Rank).....

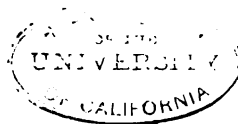
President.

* Here insert the order convening the board.

(Signature.).....,
 (Rank.)
 Member.

(Signature.).....
 (Rank.)
 Recorder.

Approved :
 (Signature.).....,
 (Rank.).....
 Commanding.



ORDERS.

The orders of commanders of armies, corps, divisions, brigades, regiments, posts, territorial departments and districts are denominated "general (or special) orders" of such army, corps, etc. General and special orders are numbered in separate series, each beginning with the calendar year, or the time of the establishment of the headquarters. They are also paragraphed, each paragraph being numbered and pertaining to only one subject.

General orders announce whatever it may be important to publish to the whole command. Special orders are such as do not concern all the troops, and are sent only to those whom they concern.

(Model for general or special orders.)

HEADQUARTERS OF THE ARMY,
 ADJUTANT GENERAL'S OFFICE,
 WASHINGTON, D. C., March 15, 189....

GENERAL (or Special) ORDERS, {
 No. 40. }

(Extract.)

1. Second Lieutenant H.....B..... , is granted leave of absence for four months, from April 1, 18.....

*

*

*

*

*

By command of Major-General,.....

(Signed) L.....S.....,
 Adjutant General.

Official :

.....

*

Aide-de-camp.

Orders issued by commanders of battalions, companies, or small detachments are simply denominated "ordors," and are numbered in a single series, beginning with the year.

(Model for company order.)

COMPANY "A," FIRST INFANTRY.

FORT SCOTT, WYOMING, January . . . , 189 . . .

ORDERS No. 4.

1.
.. . . .

(Signed) HL,

Capt. 1st Inf't. Com'dg. Co. "A."

Circulars issued from any headquarters are numbered in a separate series.

Orders and instructions will as a rule be transmitted through intermediate commanders in order of rank.

An order may be put in the form of a letter addressed to the individual concerned, through the proper channel.

(Model for letter conveying an order by a staff officer.)

HEADQUARTERS OF THE ARMY,

ADJUTANT GENERAL'S OFFICE.

WASHINGTON, D. C., January 1st, 189 . . .

COMMANDING GENERAL,

ARMY OF THE HUDSON,

ALBANY, N. Y.

Sir :

By direction of the General of the Army, I have the honor, etc., etc.

* * * * *

Very respectfully,

Your obedient servant,

L— — — — — H— — — — —

Adjutant General.

Orderly hours being fixed at each headquarters, the staff officers and chiefs of the special services either attend in person or send their assistants to obtain the orders of the day. The first sergeants of companies repair for that purpose to the regimental or post adjutant's office at "first sergeant's call."

RETURNS OF TROOPS.

Commanders of departments, posts or any separate body of troops, whether a corps, division, brigade, regiment or detachment will make monthly returns of their respective commands to the next higher authority on the last day of each month. In like manner captains will make monthly returns of their companies to regimental headquarters. In campaign, one copy of all returns of troops will be transmitted through intermediate commanders and one copy direct to the Adjutant-General. These returns are all made upon blanks furnished by the Adjutant-General of the Army.



MUSTER.

Every commanding officer is required on the last day of each month to "muster for pay" all troops under his command. The ceremony therefor, is prescribed in drill regulations. Four copies of the muster rolls are made, one for the Adjutant-general of the Army, one to be retained by company commanders who witness payments thereon, and two given to the paymaster who makes the payments, to use as money vouchers. The blank muster rolls are furnished by the Adjutant-General of the Army and call for a complete identity of each soldier and all history affecting his pay, and it is especially provided in the fourteenth "article of war" that any officer who knowingly make a false muster of man or horse shall be dismissed from the service and thereby disabled to hold any office or employment in the service of the United States.

APPOINTMENT AND PROMOTION OF COMMISSIONED OFFICERS.

Appointments to the grades of commissioned officers of the army are made by the President, subject to confirmation by the Senate, and their commissions

are signed by the President. Notices of appointments and promotions are issued by the War Department through the Adjutant-General of the Army.

Appointments to the grades of general officers are made by selections from the Army. Promotions to include the grade of colonel are made by seniority in each arm of the line, and in each staff department, subject to examination, up to the grade of major.

Vacancies in the grade of second lieutenant existing on the 1st day of July each year are filled by appointment in order as follows: (1) from graduates of the United States Military Academy; (2) from enlisted men of the army found duly qualified; (3) from civil life.

A soldier to be eligible for appointment must be a citizen of the United States, unmarried, between 21 and 30 years of age, and of good moral character both before and after enlistment.

A civilian to be eligible for appointment must be a citizen of the United States, unmarried, between 21 and 27 years of age. Both of the latter classes must be examined and approved as to habits, moral character, mental and physical ability, education and general fitness for the service by a board of five officers, appointed by the War Department; two members of the board being medical officers.

RECRUITMENT OF THE U. S. ARMY.

Any male citizen of the United States or person who has legally declared his intention to become a citizen, if above the age of 21 and under the age of 31 years, able bodied, free from disease, of good character and temperate habits, may be enlisted. The restriction in regard to age and citizenship, however, does not apply to soldiers who have served honestly and faithfully a previous enlistment in the Army.

Recruiting is conducted under the general supervision of the Adjutant-General of the Army by officers appointed as "recruiting officers" at military posts, and other stations established in various parts of the country.

Minors, between the ages of sixteen and eighteen, are enlisted as musicians, with the written consent of parents or guardians, upon special approval of the

Adjutant General of the Army. Enlistments are made for the period of three years.

Soldiers take an oath to serve the Government honestly and faithfully during the term for which they enlist and obey all legal orders of their superiors, and after a man has enlisted he becomes a "deserter" if he leaves the service at any time unless properly discharged, and as a deserter, becomes liable to the punishment of death in time of war, and hard labor and imprisonment in time of peace.

THEORY OF OUR MILITARY ESTABLISHMENT.

Our military system is based upon volunteer armies hastily raised to meet the exigencies of war and then disbanded, except in time of general peace, a sufficient regular army to guard the indian frontier, garrison seacoast fortifications and keep alive the profession of arms.

The following is the order in which military forces of the United States may be called out :

1. Regular Army Present strength 2172 officers and 25,000 men.

2. Organized Militia. { State troops, voluntarily enlisted in time of peace for state service, but which may be "called out" by the President under certain emergencies. Present organized strength, is 116,899 officers and men.

3. Volunteers. { The troops usually raised to meet the "call" of the President in time of war.

4. Drafted Militia. { Troops raised by draft from able-bodied male citizens between eighteen and forty-five years of age, when volunteer enlistments fail to meet the requirements.

5. Levee in Mass. { The final effort of the people to respond to the "call" of the President.

The President may, under the provisions of the constitution, call forth the militia of the several states to execute the laws of the United States, to suppress insurrection or repel invasion. The practice has usually been, when a greater national force than the regular army has been required, for the President to issue

a proclamation, calling upon the states for volunteers. The Governors of the several states have then established their recruiting stations and depots, and organized regiments, equipped them and appointed their officers, and upon notification that regiments were ready for United States duty, an officer of the army has been sent to muster them into the United States service, for the length of time required under the "call."

HISTORY OF THE ARMY OF THE UNITED STATES.

The history of the United States Army, of course, commences with the Revolution, and covers a little more than one hundred and twenty years. Prior to that time the troops of the colonies formed a part of the British Army.

During the Revolutionary War from 1775 to 1783, 290,000 officers and men were "in continental pay" and other militia organizations within the states participated in battles from time to time, to the number of 95,000 men and officers. But these were all militia or volunteer troops, and disbanded at the close of the war. In 1784 one company of *regular* artillery was authorized, 80 officers and men, but at that time the statutes provided that there should be no officer of higher rank than captain. When Washington was inaugurated as first President, five years later, the army contained 672 men and officers. After this the number was gradually increased year by year, until the breaking out of the second war with England in 1812. The total strength of the army at that time was 6,686.

The following table shows as nearly as can be given, the whole number of officers and men in the regular service during the

WAR OF 1812 TO 1815 WITH GREAT BRITAIN.

DATE.	OFFICERS.	MEN.	TOTAL.
July, 1812.....	301	6,385	6,686
February, 1813.....	1,476	17,560	19,036
September, 1814.....	2,395	35,791	38,186
February, 1815,.....	2,396	31,028	33,424

The militia force during the war was 31,210 officers ; 440,412 men ; total 471,622.

There were in this war ten battles, eight combats and 52 lesser actions and bombardments, and the casualties reported were 1,877 killed, and 3,737 wounded.

After the close of this war the regular army was gradually reduced until in 1823 it numbered 6,000 officers and men. After this it was gradually increased until the breaking out of the Mexican war in 1846, when its strength was 8,613 officers and men.

The following table shows the number of men and casualties in the regular and volunteer forces during the

WAR WITH MEXICO, 1845-1848.

STRENGTH.	KILLED OR DIED OF WOUNDS.	WOUNDED.
Regular Army, 42,545.....	944	2,102
State Volunteers, 73,776.....	613	1,318
Total 116,321.....	1,557	3,420

During this war there were eleven battles and thirty-five combats and minor actions.

After the close of the war with Mexico in 1849 the army was again reduced to 10,320. But in subsequent years it was increased to 16,367 which was the strength of the regular army at the breaking out of the war of secession in 1861.

During the war of secession the regular army was increased to 50,000, and augmented by volunteers and drafted troops, until in May, 1865, the federal forces in the field numbered, 1,000,516 troops.

The number of men enrolled and equipped in the northern army during the entire war was 2,690,401 including re-enlistments. They were organized into the Army of the Potomac, Army of the Tennessee, Army of the Cumberland, and Army of the Ohio; the last three being finally united into the Military Division of the Mississippi. There were other separate commands during the progress of the war, but those above named were the principal sub-divisions of the Federal Army. Towards the close of the war the difficulty of obtaining volunteers so increased that large bounties were paid, in some cases amounting to as much as \$1,500 for one man. And eventually "drafts" were resorted to in the

states for filling quotas. The total number drafted during the war was 294,266. Of those drafted 73,607 furnished substitutes and 68,724 paid commutation

The following table gives the northern and southern forces in the War of Secession from 1861 to 1865.

DATES.	FEDERALS.	CONFEDERATES.
January 1, 1861.....	16,367	Arming.
July 1, 1861.....	186,751	150,000
January 1, 1862.....	575,917	350,000
March 31, 1862.....	637,136	500,000
January 1, 1863.....	918,191	690,000
January 1, 1864.....	860,737	400,000
January 1, 1865.....	959,460	250,000
March 31, 1865.....	980,086	175,000
May 1, 1865.....	1,000,516	None.

There were 107 battles, 102 combats, and 362 actions, sieges and lesser affairs during this war.

The casualties in the Federal Army during the war numbered 349,000, and those in the Confederate Army somewhat more than 300,000.

The volunteers and drafted troops were mustered out at the close of the war, and the regular army reduced, till 1879, when the enlisted strength was fixed at 25,000, which has since continued to be its strength.

This brief account may serve to outline the four greater wars of the country in which volunteer troops have formed the bulk of our armies in the field, but beside these wars with civilized enemies a continuous indian warfare has been carried on by the regular army on the frontiers of the country. The Seminole Indian war in the gulf states lasted nearly a quarter of a century, covering most of the period between the war of 1812 and the Mexican war; in which more than 2,000 U. S. troops were killed. The Sioux massacre of 1862 gave the Army quite a casualty list; General Canby and portions of two companies were massacred during the Modoc war in 1872-73 in Northern California and Oregon, General Custer and his entire command of five companies of cavalry were massacred by the Sioux in Montana in 1876, and we can count up 650 battles, fights and actions against the Indians since 1812.

INSPECTOR GENERAL'S DEPARTMENT.

The duties pertaining to this department are to keep the War Department and the various commanders of military departments, separate armies, corps, divisions, brigades, etc., informed concerning the discipline, instruction, and all that bears upon general efficiency within their commands, and to protect the Government by frequent inspections of the disbursing accounts of officers, expending moneys appropriated by Congress for the support of the Army.

Besides the Inspector General, this department contains two colonels, two lieutenant colonels and two majors, who are assigned as assistant inspector generals at the various department headquarters. When there are not a sufficient number of officers belonging to this department to supply all of the places, line officers are detailed as acting assistant inspector generals.

The duty of inspectors is to a large extent of a nature confidential to the general under whom serving, but his field of work involves a thorough acquaintance with the practical details of all arms and departments of the service.

JUDGE ADVOCATE GENERAL'S DEPARTMENT.

This is the law department of the army. Besides the judge advocate general this department contains one colonel, three lieutenant colonels and three majors distributed among the several military departments, where as staff officers of the commanding generals they supervise charges preferred against those in the military service, and matters coming within the jurisdiction of military commissions, court martial, courts of inquiry, etc. When there are not enough officers properly belonging to the department to fill the positions required, line officers are detailed as acting judge advocates on the staffs of the general officers.

THE LAWS OF WAR AND MILITARY COMMISSIONS.

It is only when the civil courts are closed by the declaration of "martial law" by the President, by congress, by a state, or by an independent military commander that military commissions are organized to sit and take cognizance of offences committed by persons not in the military service and of such offences

committed by officers and soldiers as in other times would come before the civil court. These commissions are governed in their proceedings by what are known as the rules and usages of war. Whence arise what we call the "Laws of War."

A military commission is a high and arbitrary function made necessary by a state of war and its members are usually of high rank and very carefully selected.

MILITARY LAW.

This comprises the statutory code known as the "*articles of war," and other regulations and orders issued for the government of the army as a separate community, alike in peace and war.

Military law proper is subordinate to the civil, and acts only when the latter does not, for the purpose of maintaining discipline within one of the executive departments of the government, namely, the Army.

COURTS-MARTIAL.

Military law is enforced through a tribunal called a court-martial convened by the President or by subordinate commanders for their own commands. Courts-martial are not a part of the "Judiciary" of the United States, and there is no "appeal" beyond the decision of the chief executive.

Their jurisdiction is entirely "criminal," and their function is to assign punishment, without authority to adjudge damages for private wrongs.

There are grades of courts-martial, gauged by the rank of the offender and the gravity of the offense. Only commissioned officers are eligible to be detailed for this duty. In addition to the members of the court, a judge advocate is detailed (except in "field officers courts" and "summary courts") to represent the government, advise the court, and record the proceedings, but he is not a member of the court. The members of the court act in two capacities—as judge and jury.

The senior member of a court-martial becomes its presiding officer, and the commander convening the court reviews the proceedings, and approves or

* See U. S. Army Regulations.

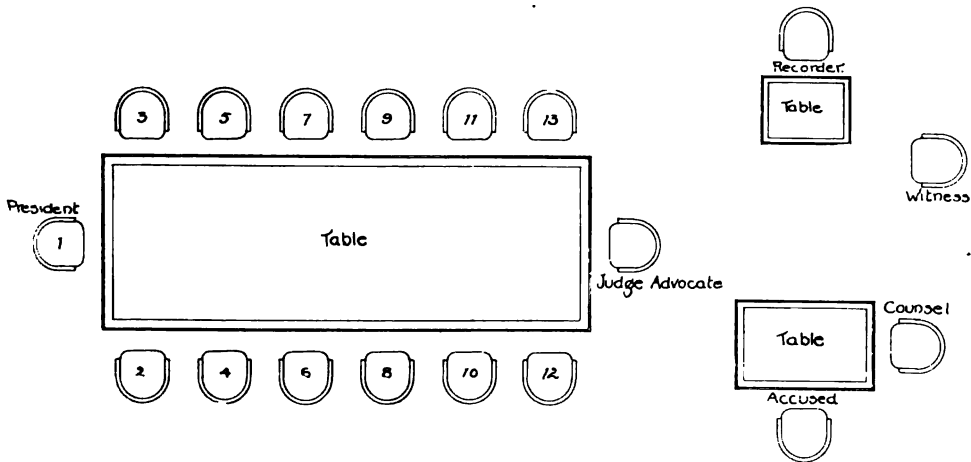
revokes the sentence. The indictment before a military court is called the "charge and specifications." The charge sets forth the offense, and the specifications the particulars as to time, place, etc. "Charges" may be preferred by any commissioned officer, and forwarded through military channels to the officer competent to convene a court.

Courts-martial, in the absence of any specific statutory rules, are in general governed by the rules of evidence to be found in the common law.

In the U.S. Military service, the following named courts-martial are authorized: the general court-martial, the field officer's court, the summary court, the garrison court-martial, and the regimental court-martial, the last four being generally spoken of as the inferior courts-martial.

GENERAL COURT MARTIAL.

The following diagram shows the arrangement of a court-martial room:



A general court-martial is convened either by the President as commander-in-chief, by a general officer commanding an army, territorial division or department, or by a colonel commanding a separate department, and has jurisdiction over all persons and offenses known to military law. It consists of from five to thirteen members, and the judge advocate. Less than five members and the judge advocate do not constitute a legal court for trying cases.

A general court-martial habitually sits in full dress uniform and side arms, witnesses attend in full dress uniform and side arms, and the judge advocate in undress uniform without arms. The accused, who holds the status of "in arrest," would attend in undress uniform and without arms.

FIELD OFFICER'S COURT.

The field officer's court is composed of a single field officer of the regiment to which the accused belongs. Its jurisdiction is limited to time of war, and its punishing powers are the same as that of a "summary court."

SUMMARY COURT.

The summary court consists of one officer,—the "line" officer, second in rank at the post or station of the command of the accused,—it has jurisdiction only in time of peace, and then practically takes the place of the field officer's court, which operates only in time of war.

This court cannot try officers or cadets; it can try only enlisted men; and enlisted men who object to trial by such courts must be granted trial by a garrison court-martial.

It can try only cases the punishment for which does not exceed confinement and forfeiture of pay for one month, and reduction of a non-commissioned officer to the ranks.

GARRISON COURT-MARTIAL.

This court is composed of three members and it also has a judge advocate.

In time of peace it has jurisdiction in cases where the accused objects to trial by a summary court, and in some cases where the composition of the command is such that this latter court does not apply. In time of war, the garrison court-martial has jurisdiction only when the field officer's court does not. Its punishing power is limited to that given above for the summary court.

REGIMENTAL COURT-MARTIAL.

The regimental, like the garrison court-martial, is composed of three members and a judge advocate. It has jurisdiction only within a regiment or partic-

ular corps, and its punishing power is practically the same as the garrison court-martial.

The following is model form for charges and specifications :

“Charge and specifications preferred against Private A... .. B.....
Co....., U. S. Infantry.”

Charge—“Dirobedience of orders, in violation of the 21st Article of War.”

Specification—In that Private A..... B....., Co.....,U. S. Infantry, having received a lawful command from his superior officer, 2d Lieut. C..... D....., Infantry, to (insert order), did willfully disobey the same.

This at....., on the.....of.....,18.....,

C D.....

Captain,Infantry,
Officer Preferring Charge.

Witness :

1st Sergeant E.....F , Co.....Infantry.

Private G.....H....., Troop.....Cavalry.

Mr. L..... .K.....,Citizen.

MOOT COURT-MARTIAL.

At colleges and schools having a military organization and a theoretical military course of instruction, moot court-martial, under the supervision of an instructor, held for the purpose of trying feigned cases are good object lessons which the students will retain in mind as a model whenever they may have occasion for participating in such proceedings, and in such courts the “Manual of Court-Martial” prepared by direction of the Secretary of War in 1895 should be followed, and the form for “record of a general court-martial” is given in that book.

COURT OF INQUIRY.

These are tribunals consisting of from one to four officers and a recorder, who is also an officer, convened for examining transactions of, or accusations or

imputations against officers and soldiers. They cannot be ordered except upon the demand of the person whose conduct is to be inquired of. The proceedings are conducted similarly to those of courts-martial. They pronounce no sentence—only offering opinions based upon facts established in evidence.

QUARTERMASTER'S DEPARTMENTS.

This is the great supply department of the army, supplying clothing, camp and garrison equipage, stationery, fuel, forage for animals, and all means of transportation. It builds roads, bridges, railways, boats, docks and wharves, and the military posts, (not considered as permanent fortifications), and has custody of public buildings and lands in use by the army. It requires business capacity in its officers of the highest order, and in time of war its efficiency regulates very largely the success of the army. Beside the quartermaster-general at Washington, D. C., the department contains four colonels, eight lieutenant-colonels, fourteen majors and thirty captains who are assigned as chief quartermasters at the various headquarters and as depot quartermasters at convenient points over the country. Besides the officers properly belonging to this department, each regiment has one of its lieutenants detailed as "regimental quartermaster" and every post or separate command—even if only one company—must have some officer detailed as acting assistant quartermaster. This usually falls to the lot of lieutenants of the "line" who all, in course of time, get more or less of this business training, which is highly important experience for fitting officers for promotion to higher grades where they conduct large operations. If they do not know all the details connected with moving and supplying armies they are not fitted for planning and fighting battles successfully.

TRANSPORTATION.

Supplying and managing the transportation of an army is one of the most important duties devolving upon the quartermaster's department, into which enter the strength and composition of the forces, the nature of the country, the soil and how rain affects it, the streams to be crossed and nearly all the business occupations in civil life.

WAGON TRAINS.

The number of wagons allowed depends upon the nature of the service and the amount of baggage and supplies to be carried with the command. On western frontier service, there is usually allowed for a squadron of four troops of cavalry, two wagons to each troop, one for the major and staff, and an ambulance, making for the squadron a train of nine wheeled vehicles. This is the allowance for an ordinary trip when tents and five days' rations are carried. An infantry battalion would have less wagons, as only forage for mules is required, while cavalry horses have to be provided with grain.

If the cavalry graze their animals instead of feeding grain, as is frequently necessary, their number of wagons would be reduced, while if either cavalry or infantry were changing station and taking along all baggage, larger trains would be necessary.

In actual field* service in war when the troops bivouac and each soldier carries his clothing and two days rations' upon his person, but one wagon is allowed to each battalion for baggage, and officers are allowed baggage as follows :

Major General	1000 pounds.
Brigadier General	700 "
Col., Lt. Col., or Major	500 "
Captain	200 "
Lieutenant	150 "

On the road a 6-mule team is calculated to occupy 17 yards in depth, or 109 wagons to a mile. The quartermaster of each command forms the wagons pertaining to his command into one train which he personally conducts on the march.

PACK TRAINS.

Pack trains are used, when the nature of the country will not permit wheeled carriages to pass, and a certain portion of the *means of transportation* with every cavalry regiment should consist of pack trains, to be used by

* Lecture No. 1, page 13, and Lecture No. 2, page 42.

troops or squadrons on detached service, so that they may move regardless of roads. As time goes on, pack animals will probably come into more extensive use with infantry as well as cavalry for supplying the fighting line with ammunition, and packing machine guns, where wheels cannot go.

Horses and ponies are occasionally used as pack animals, but the mule is the favorite pack animal in the United States, the same as for wagon transportation. In other countries the elephant, camel and the ox are extensively used for this purpose, and many even in this country advocate the use of the ox as a pack animal because he is much cheaper than the mule, and in cases of emergency may be killed for beef.

The great superiority of the mule over other animals, is that he will stand a greater amount of abuse and starvation and will suffer but little from the effects of a hard drive. and also that he is more intelligent and tractable.



Fig. 19.

Figure 19 illustrates the cross-tree, saddle and gear used in packing. From 150 to 200 pounds are carried upon each animal, the cargo being made up in two packages of equal bulk and weight and one of these securely lashed to each side of the pack-saddle. Each cavalry troop should have a train of twelve mules for field service.

The "packing drill" is in the cavalry drill regulations.

RAILROAD TRANSPORTATION.

Railroads have come to play so important a part in modern warfare that their construction, use and preservation are now prominent features in an army officer's education.

Students in the civil engineering courses in our colleges need but a few suggestions to enable them to see how to turn their education to the advantage of the government in case of war. The transportation of rations and materials of war, and the concentration of troops for battles, are to be accomplished largely by railroads. The "division wagon trains," and "pack trains" for the cavalry, will of course, be required in the vicinity of the fighting lines. But supplies from the base of operations and from depots will be forwarded to where the division teams will receive them, by rail, and the wagon trains together with the large armies to which they belong, will have to be carried back and forth over the country by rail to meet the demands of strategic operations. Our own railroads must be repaired and operated, new ones frequently built, and damages repaired upon those abandoned by the enemy. The provision and detailed arrangements for transportation by rail fall to the lot of the quartermaster's department, and the operations connected with loading and unloading the trains fall to the lot of the regimental and battalion quartermasters, under the direction and supervision of their respective commanding officers, and all officers should have a thorough acquaintance with such details. The rate of travel is to be determined by the commanding officers, usually from 15 to 20 miles per hour, with stops at least once in each 24 hours for unloading, feeding and watering animals, and every three hours short stops should be made for the men.

There must be platforms of some kind supplied for loading and unloading, as well as store-houses or tentage for perishable articles. Skids of wood or sliding platforms for artillery pieces, wagons and horses, should be provided and carried on trains, so that embarkation and disembarkation may be accomplished speedily where there are no stations or material at hand for improvising platforms. Men are usually put in passenger cars which carry 60 men comfortably, and 90 if crowded. The smaller coaches seat but 50, and for long journeys the emigrant

sleepers are used, which accommodate 35 to 40. Officers are furnished the regular sleeping cars when practicable. When passenger coaches are not procurable, box cars must be fitted for such use. The cars are assigned by the quartermaster, each car being marked with the letter of the company, and the number of regiment it is to carry. The sub-divisions of a command are marched to the platforms, or near the cars, and loaded as may be directed by the commanding officers. Usually, knapsacks are taken off, cartridge boxes, canteens, etc., slung around to the front of the soldiers, and the men filed into the cars in their order in ranks, each man retaining possession of his gun and accoutrements. A commissioned officer should be assigned to each car. The approaches to the train should be kept clear by sentinels, if necessary, troops marched to their position at attention and silence preserved until the cars have started. For loading the horses, baggage, artillery pieces, wagons, etc., fatigue details are made from the commands to which they pertain, and the loading goes on simultaneously in the different parts of the train. Under a well regulated system it requires but a short time to put a command upon a train of cars ready to move.

For short trips horses may remain harnessed or saddled, supplies loaded in wagons, and the wagons hauled on to the cars, as packed for the road. Box cars or slat cars are used for stock. Artillery horses are unhitched, and teams kept together, with sections and platoons in the same car as far as practicable. Mule teams for the wagons should be kept together in the same way. For long journeys, animals are unharnessed and unsaddled, and the harnesses and equipments of each section, team, troop, etc., marked and kept together in special cars. Guns and their carriages, and wagons are carried upon open platform cars, strips being nailed on the sides in front and rear of the wheels to keep them from slipping, and no part left to project beyond the car. The baggage of each company, troop or battery, should be kept on the same train with it, and the baggage cars and stock cars marked the same as the coaches.

Commands disembark under the same system as explained for embarkation, and as fast as they leave the cars are marched to a position suitable for formation, or put in camp or bivouac.

Platform cars are about 28 feet long and 8 feet wide and each will carry two field pieces with their caissons or two siege guns with carriages and limbers complete, or two army wagons standing, with considerable baggage packed around them. If the wagons are knocked down four may be put on a car. 30,000 pounds is the maximum load for freight cars and 24,000 pounds is reckoned as a safe load over the average road. From 14 to 17 horses or mules are put in each box car, depending upon the size of the animals. It is best to have as many as will go in, as they ride better when the car is full. The horses or mules should all face toward the same side of the car and are hitched by their halters to the framework.

A railroad used to connect an army with its *base of supplies* must be thoroughly guarded, as it is the business of the enemy's cavalry to destroy it if possible, and at every unguarded place they will ride in to tear up the track and destroy bridges and tunnels, which with modern appliances can be accomplished very quickly.

When there is any probability of danger along the route, a guard train should precede the main column, with proper tools for repairing the track and telegraph line, and removing obstructions. And every train should have a telegraph operator, with portable instruments, so as to tap the wires, and communicate from any point.

Military railroading is so extensive a subject, that it can only be outlined here. It is usually treated under three heads, viz: railway construction, railway destruction, and railway management.

To supply an army of 100,000 men in the field, by means of a single line of track, the proportion of rolling stock should be one engine and 24 freight cars to every four miles of road, and this does not provide for the conveyance of troops.

Enough may here have been given to enable an educated man to apply his education and good judgment, and hastily prepare for moving a command by rail. There is now such an army of practical railroad operators and workmen in the country, that almost anywhere efficient men can be employed to fill the different positions in operating and constructing railroad. It may be almost safe

to assume that they would be found in the ranks of every volunteer company in case of a war.

WATER TRANSPORTATION.

In the United States Army there are no vessels kept especially fitted up for the transportation of troops and materials of war, still our rivers and seas and even the ocean are constantly used as ways of transportation for the army, and it frequently happens in time of peace that one of the first duties of a lieutenant upon joining his regiment is to supervise the loading and unloading of river boats, and in case of war it might very naturally be one of the first duties falling to the lot of volunteer officers, to move a command upon sea going vessels. In any foreign war, except with Mexico or Canada, ocean transportation would be extensively used. During the war of the Rebellion there were at one time 400 sea and bay going crafts employed at the quartermaster's department at Alexandria, by which from 1000 to 3000 tons of coal were used daily. When embarking and disembarking are accomplished with wharf facilities, it is comparatively an easy problem. Animals may be led on by the use of gang planks and artillery pieces, wagons, etc., run on by hand, and these gang-planks carried by the vessel ready for disembarking. When it is not practicable to use gang-planks, animals are hoisted on board by means of a sling and lifting tackle and are unloaded by the same means. Other supplies and munitions are landed in the same way.

If the voyage is short and the water smooth, stalls are not absolutely necessary for animals on board ship, but when a voyage is to cover several days, and likely to be rough, stalls should be fitted up between decks. Horses stand best athwart-ship, as in this position they best accommodate themselves to the rolling motion of the vessel, and when on the upper deck they should face inward, that the spray will not strike them in the face, and also because they will suffer less from fright and nervous excitement when facing each other.

A vessel of twenty-five feet beam will accommodate two rows of horses, leaving sufficient space between the rows and the croups of the horses and the sides of the ships, for the operation of feeding, watering and cleaning out, which

should be performed twice a day as in garrison. They stand better when close together. Stalls and arrangements for securing horses must be strong beyond any possibility of giving way, as the force exerted by a row of horses as they swing with the motion of the ship in a heavy sea is very great, and the horses will be about ruined if the fastenings give way. In loading vessels with stores for a military expedition, the cargo of each should be composed of an assortment of such stores as may be available, in case of the non-arrival of others, and they should be so placed that they may be reached in the order in which they are required for service. A list should also be made of the stores on board of each vessel and the place where they are to be found in it, and a copy given to the officer who is to have charge of their use or disembarkation. Each boat should be marked at the bow and stern, on both sides, in large characters with a distinctive letter and number.

The act of landing troops and munitions of war from a boat or ship at a wharf is simply the reverse operation of embarking.

Transports should be provided with the essential articles for landing their cargoes where wharf accommodations are not available. Each transport should carry four pontoon boats and the equipments for two rafts. By putting these pontoon outfits together, several transports will be able to form a bridge to the shore, or construct rafts, on which to land their cargoes.

The operation of disembarking, then, consists in bringing each transport alongside of the wharf-head of the bridge, and using gang-planks, or else lowering the cargo by means of sling and tackle. As a last resort animals may be swum ashore and materials landed in the ship's boat, the horses being lowered over the side by slinging. It is a bad plan at all times to plunge the horses from the boat into the water even if the deck of the vessel is low, as it is liable to strain and injure the animal and will ever after make him timid and shy about taking the water when it is necessary to cross streams on the march.

TENTS AND CAMP EQUIPAGE.

The Quartermaster's Department furnishes all tents for officers and men and the camp equipage, such as cooking utensils, shovels, axes, drums, trumpets, etc.

FUEL AND STATIONERY.

Fuel and stationery are supplied by the Quartermaster's Department, according to tables of allowances contained in Army Regulations.

BARRACKS AND QUARTERS.

Barracks and quarters for troops in garrison are provided by the Quartermaster's Department.

PUBLIC ANIMALS.

The Quartermaster's Department furnishes all public animals and the forage and veterinary medicines consumed by them. Cavalry and artillery horses are turned over to troop and battery commanders, and the forage, medicines, etc., are issued for limited periods by regimental or battalion quartermasters upon requisitions signed by troop and battery commanders, and approved by the regimental or battalion commanders. Officers provide their horses but the Quartermaster's Department furnishes their forage as for public animals.

CLOTHING.

Clothing for enlisted men is furnished by the Quartermaster's Department. Company, troop and battery commanders secure it from the regimental or post quartermaster upon requisitions approved by the "commanding officer" and issue it directly to the men.

Officers purchase their uniforms and equipments.

SUBSISTENCE DEPARTMENT.

This department supplies the rations for enlisted men and such civilian employees as are entitled to them. It also furnishes in addition to the articles making up the regular rations, grocery stores, towels, sewing materials, etc., that officers and enlisted men wish to purchase for their own use, and funds for constructing ovens for baking the bread.

Besides the chief of this bureau in Washington who ranks as a brigadier general, this department contains two colonels, three lieutenant colonels, eight

major and twelve captains who are detailed at the various department headquarters, as chief commissaries on the staffs of the commanding generals, and as purchasing officers in large cities.

In times of peace, at each military post and with each separate command in the field a lieutenant of the line is detailed as acting commissary of subsistence, who performs all the duties pertaining to the subsistence department within that command.

In time of war, volunteer troops usually have a regimental commissary on the staff of the colonel.

RATIONS.

A ration is the established daily allowance of food for one person.

The U. S. Army ration is as follows :

ARTICLES.	ALLOWANCE.
<i>Meat ration.</i>	
Pork	12 ounces per ration
or Bacon	12 " " "
or Salt Beef	22 " " "
or Fresh Beef	20 " " "
or Mutton	20 " " "
or Fresh Fish	18 " " "
or Pickled Fish	18 " " "
or Dried Fish	14 " " "
<i>Bread Ration.</i>	
Flour	18 ounces per ration
or Soft Bread	18 " " "
or Hard Bread	16 " " "
or Corn Bread	20 " " "
<i>Vegetable Ration.</i>	
Potatoes	16 oz. (or potatoes 80%, onions, 20%).
or Beans	15 pounds per 100 rations.
or Peas, dried	15 " " " "
or Rice	10 " " " "
or Hominy	10 " " " "

Coffee and Tea Ration.

Coffee, green	10 pounds per 100 rations.
or Coffee, roasted	8 " " " "
or Tea, black or green	2 " " " "

Other Articles of the Ration.

Sugar	15 pounds per 100 rations.
Vinegar	1 gallon " " "
Candles	24 ounces " " "
Soap	4 pounds " " "
Salt	4 " " " "
Pepper, black	4 ounces " " "
Yeast powder	4 pounds " " "

When troops travel without cooking facilities, 75 lbs. of canned beef and 33 lbs. of canned baked beans per 100 rations may be issued in lieu of the above meat and vegetable rations.

Captains draw the rations for their men in bulk from the commissary office of the command and the raw material is converted into food at the company kitchen.

Officers purchase their subsistence stores from the commissary or elsewhere at their option and have their cooking done at their separate "messes." Officers of a company usually mess together in the field and there is a headquarters' "mess" in each regiment.

It was confidently asserted in publications during the war of the Rebellion that no army in the world was so well provided for, in the shape of food, either as to quantity or quality, as the Army of the United States, and in later years the ration has been greatly improved, and the economy of cooking so thoroughly studied by officers that with the latitude allowed company commanders, in exchanging rations saved, for articles not supplied, an inviting table may be set in the company mess hall.

Besides having a knowledge of cooking and preparing food, sufficient for instructing the cooks, officers should be conversant with the nature and quality of

meat, and the way in which oxen and sheep, when killed, are divided into joints. And such regulations should be adopted that all soldiers in the course of time will become fair cooks, so that on detached service any man will be able to cook his own rations.

COOKING UTENSILS.

Troops in quarters are generally provided with cooking ranges or stoves, furnished with suitable fixtures. In the field the utensils are of the most primitive character, consisting of iron camp kettles, mess pans, frying pans and tin tea pots.

To extemporize stoves and cooking places, the most simple mode is to dig a trench eighteen inches wide, twelve inches deep, and from four to six feet long. At each end place a forked stick, with a stout sapling extending from one to the other, from which to suspend the kettles.—See figure 20.

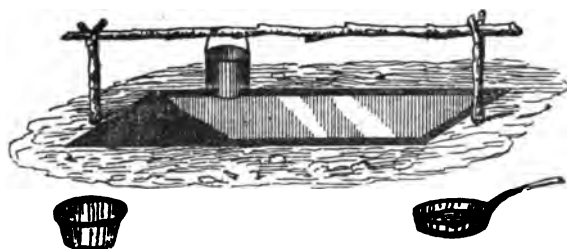


Fig. 20.

Dough may be mixed in mess pans, on a piece of canvas, on a rubber blanket, or in a flour barrel or flour sack. Empty tomato cans, etc., can be used as vessels in which to draw tea, make coffee, etc., in the absence of coffee pots.

MEDICAL DEPARTMENT.

Besides the Surgeon General at the head of this bureau at Washington, with the rank of brigadier general, this department contains six colonels, ten lieutenant colonels, fifty majors, eighty-one captains and forty-four first lieutenants. They are officially designated surgeons down to include majors, while the captains and lieutenants are designated assistant surgeons. The higher officers of this department are assigned to the various department head-quarters as medi-

cal directors on the staffs of the commanding generals. The others are assigned as post surgeons and assistants at military posts. Two or three medical officers are stationed at some of the large posts, from which they are sent into the field with commands that are ordered out. Every post has a well equipped hospital with a dispensary. This department supplies all medicines used in treatment of the sick.

In the field with large commands, white flags, with the conventional "red cross" mark the general and field hospitals, and the way to these hospitals.

In time of war, a surgeon and two assistant surgeons are attached to each regiment.

Besides the officers in this department there is what is termed a "hospital corps," consisting of one hundred and six hospital stewards, eighty-nine acting hospital stewards and five hundred and seventeen privates. These perform all the *hospital service in garrison and in the field, and render the necessary ambulance service under the officers of the medical department. Army regulations further require that in each company, troop or battery, four men, to be known as *company bearers*, be designated for instruction in the duties of litter-men, and the methods of rendering first aid to the disabled. During an engagement, acting under orders of their commanding officers and supervision of their regimental surgeon, they render first aid to their wounded comrades and carry them to the rear. Upon being relieved by members of the "hospital corps," they immediately join their companies.

Women are employed at post and general hospitals as hospital matrons who do the laundry work for the sick.

As disease causes about twice as many deaths as battle, and of those wounded in action, probably two-thirds may recover under proper treatment, it is the purpose of the government to keep the medical department upon the highest possible basis of efficiency, not only as regards the personnel of the corps, but also the instruments and medical appliances used.

It is the intention to furnish one doctor with every command as large as a company, and commanding officers, unless acting under emergencies, give great

*Lecture No. 1, page 15,

weight to the opinions of the medical officers belonging to their staffs, and to hygienic considerations affecting their commands.

Subaltern officers of the line are sent on many expeditions in command of small detachments unaccompanied by a doctor, and the study of both military hygiene and practical treatment of the sick and injured should form a part of every officer's education.

MILITARY HYGIENE.

***Military hygiene means the care of troops.** This duty is ever present and concerns not only medical officers but the staff officers who supply food, clothing and the habitations of troops, as well as the line officers who control the daily lives of their soldiers. Commanding officers should look well to selecting healthy sites for posts and camps, to water supply and drainage, and to the enforcement of rigid police regulations. And every company commander should, by a due study and observation of the laws governing health, direct the personal hygienic life of every man in his company, see that he cultivates habits of cleanliness, habits of temperance as well in eating as drinking, habits of exercise, habits of physical improvement, habits of bathing and habits of regular sleep.

In building and assigning barracks, the proper amount of air space (from 600 to 1000 cubic feet per man) should be allowed, and the problem of ventilation carefully studied by company officers together with the science and art of supplying wholesome and inviting food for the company mess.

Vaccination as a practical immunity against small-pox, must be carefully attended to. Vaccination in infancy repeated at the age of 14 or 16, will generally suffice, still every recruit must be presented for examination as soon as he joins his company and in every company a record kept concerning the vaccination of every man therein.

Under clothing should contain about 30 per cent cotton and 70 per cent wool—what is usually called merino—as this combination is considered the best for all climates and conditions of service.

*See "Military Hygiene," by Dr. Woodhull, the authorized text-book for the army.

In the field soldiers habitually wash their own clothing, many do so in garrison, and every soldier should know how to do his own "mending."

Soldiers should be dressed as nearly alike as possible throughout the army, as a uniform has obvious military advantages, though there must be some sanitary modifications allowed in the different climates. Color in clothing is a physiological as well as a military consideration. Cadet gray is the best color and next to it butternut dye, but blue will probably always remain the color of the United States uniform upon traditional considerations. Colors draw fire in action, in proportion to their conspicuousness, viz: 1 red, 2 white, 3 black or dark blue, 4 light blue, 5 butternut, 6 dust gray.

Color does not influence bodily heat or the external temperature except as directly derived from the sun, but protection against the sun's rays depends entirely on color irrespective of texture. White absorbs the least heat and is consequently the coolest, black the most and is the warmest, and blue is next to black. For these reasons troops are issued drab campaign hats instead of black. A thin white cotton tissue worn over a dark cloth will reduce the temperature 12.6° F.

Absorption of odor depends partly upon texture and partly upon color. Black absorbs odors the most, blue next and white least. White canvas stable frocks and overalls are therefore issued to calvarymen, for use in grooming their horses.

Campaigns are won by good marching as much as by good fighting, and officers should be mindful of the care of men's feet as well as of the feet of horses. Even in the cavalry a large part of the duty must be performed on foot, and boots and shoes are potent to preserve or damage those important members. Stockings also must be looked to, that they fit the feet, do not wrinkle, and are kept clean and properly mended. When unaccustomed to marching, the feet should be soaked or greased before starting, to prevent chafing. At the end of the march they should be washed or wiped very clean and dry.

It is only intended here, to call to mind, in a general way, enough of military sanitation, to fix upon the student's mind the broad field of science that lies between the drill regulations and the practical work of commanding men in act-

ive service, and that "soldiering," considered in its practical details, finds use for what students learn in all the departments of civil science.

PAY DEPARTMENT.

This department pays officers and soldiers the salaries allowed by law. Officers are paid upon their own certified pay accounts, and soldiers upon "muster and pay rolls," made up and signed by company commanders, approved by mustering officers, who are the commanding officers of the post, regiments or separate battalions.

Besides the paymaster general at Washington, the department contains two colonels, three lieutenant colonels and twenty-nine majors. The senior officers of the department are assigned as chief paymasters on the staffs of the various commanding generals, and the others are stationed at convenient points in the country, from which they make monthly or bi-monthly payments to troops as they may be ordered by the department commanders.

This department also pays the mileage allowed officers travelling on duty, when transportation in kind is not provided by the quartermaster's department, and commutation of quarters when officers do not receive their quarters in kind.

CORPS OF ENGINEERS.

This is a scientific corps, which in time of peace is considered as a staff department. It, however, contains what is known as the "engineer battalion" of four companies, organized somewhat like the infantry, though having "first class" and "second class" privates. The former class receives a higher rate of pay than the latter, and are skilled men.

Besides the chief of engineers at Washington, who ranks as a brigadier general there are in this corps six colonels, twelve lieutenant colonels, twenty-four majors, thirty captains, twenty-six first lieutenants, and ten second lieutenants, who in time of peace are employed in constructing the permanent defences of the country, or are detailed to take charge of the river and harbor improve-

ments, such as constructing break-waters, opening channels for the navigation of rivers, superintending the erection of government buildings, etc., and the younger officers are detailed as engineer officers on the staffs of general officers.

In time of war this corps becomes practically an "arm" of the "line," organized into companies like infantry, to be assigned to the different *army corps as sappers, miners, pioneers, etc. The details of the field work of this department will be treated under the head of "military engineering," lecture No. 9.

†SEA-COAST AND HARBOR DEFENSES.

The means of defense of the country are usually classed as follows:

First or exterior line—the Navy.

Second—Land fortifications, including sub-marine mines and torpedos.

Third—Interior communications by land and water.

Fourth—The regular army and organized militia.

Though the Army and Navy are distinct branches of the service, they must be co-ordinate and co-operative. Naval construction is conducted by officers of the Navy, while the land fortifications are planned and constructed by the Engineer Corps of the Army. These land fortifications must not only be so constructed as to afford security and refuge for the commercial marines, protect the naval depots and serve as the base of operations for naval fleets, but must be complete in themselves for the defense of the principal cities and harbors, when the floating defenses shall be called to operate in other parts. The field of work for the engineer corps of the Army, in connection with the sea-coast defenses becomes more important year by year, as our sea-board cities grow in wealth and population.

Previous to the Revolution our seaports were mere villages and naval establishments and military depots were unknown. A small work of sand and palmetto-logs in Charleston Harbor, South Carolina, was about the first effective work

*Lecture No. 1, page 15.

†General Abbott's "Defence of the Sea-coast of the United States" should be a reference book in this connection.

at fortification in this country. Here Colonel Moultrie, with 30 guns on land, against 270 afloat, in 1776, decisively repulsed the attack of a British fleet and taught our people the value of fortifications. After the Revolution, Fort Columbus, Castle Williams, and Castle Garden were built in New York Harbor, and in nearly all of our chief ports, batteries were constructed, though they were defective in design and weak and perishable in material. This, however, commenced what is known among engineers as our second system of defense in support of the Navy, and did some service in the war of 1812.

No sooner had this war ended than the defense of the Atlantic sea-board was seriously taken in hand and during the coming forty-five years the casemate system was perfected. This system of admirably constructed forts was completed about the commencement of our War of Secession. These forts were built of masonry, usually, placed but little above the water level, rising in one, two or three "casements" and surmounted by a tier in "barbette." Fig. 21 represents in ver-

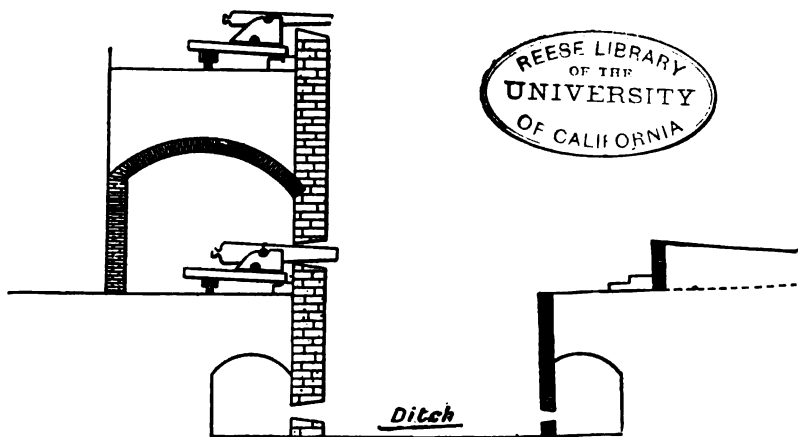


Fig. 21.

tical sections, a fortification of this old school type, and such as are still seen at the entrances of our principal harbors, monuments to the engineering skill of the day of smooth bore guns, but almost useless against the rifle ordnance of the present day.

In the permanent works of to-day, iron is, in a large measure, superseding all other materials and modern fortifications have taken the form of turrets—revolving or stationary—cupolas, casemated or iron-clad batteries of cast iron, wrought iron or steel.

Most of the European powers, except France and England, have adopted the “Gruson” chilled cast iron plate for turrets. These are cast in curved form, the largest plates having a thickness of 49 inches at the centre, and decreasing towards the top and bottom.

Fig. 22 gives the exterior view of a “Gruson” chilled iron armor, stationary six-gun battery.



Fig. 22.

At each end the battery rests against masonry, which is protected by earth parapets against shot. In front of the battery is a concrete glacis covered with granite blocks.

England is using wrought iron in construction of turrets, and France is using all steel plate.

Compound plates of wrought iron faced with steel or of cast-iron are likely to be used in the future. The cost of the chilled iron plates is from \$150 to \$200 per ton, wrought iron plates from \$220 to \$230 per ton, and all steel plates about \$330 per ton, while the compound plates cost as high as \$450 per ton. These figures may serve to give the student a little idea of the cost of modern fortifications.

Fig. 23 gives a vertical section of one of the "Gruson" chilled iron revolving turrets.

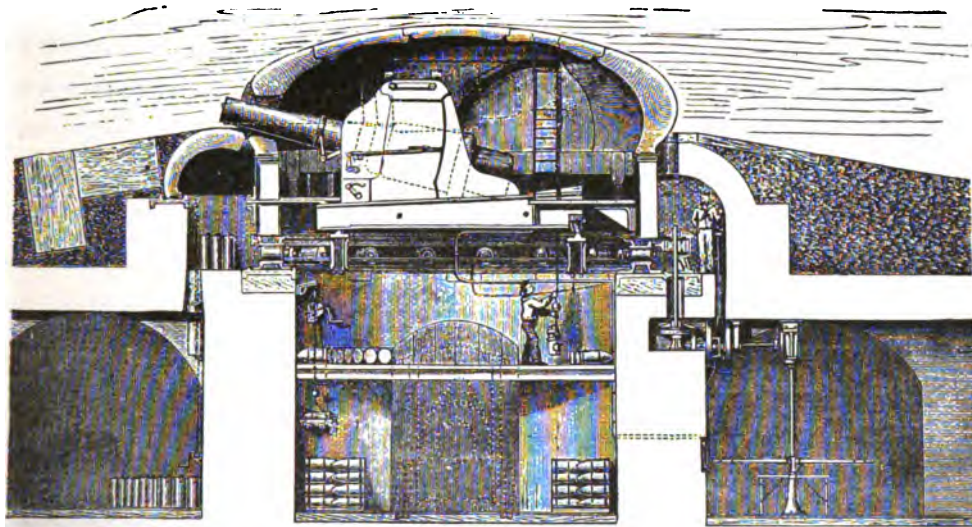


Fig. 23.

In construction of land defences for harbors and cities, a continuous line would not be attempted, but instead lines of detached works placed at commanding points, and in defensive relation to each other.

General Abbot of our Engineer Corps states in his "Defence of the Sea Coast of the United States" that, "A sea coast fortress of today, suited to the needs of this country consists of a central 'keep' provided with bomb-proof quarters and arranged for a vigorous defense; of detached high power gun batteries (turrets, iron casemates, lifts, barbette batteries for disappearing guns, open barbette batteries, etc., according to circumstances), so placed as to sweep the channel and approaches, but with ample space between their sites to prevent mutual interference; of detached mortar batteries, usually in rear of the guns, and so far as possible out of sight of the enemy; of machine guns in covered positions to sweep slopes and approaches, and the interior of the batteries in case of surprise; of wire and other entanglements to check the advance of the escalade parties from

boats; of secure operating rooms, cable shafts, galleries, and flanking guns for the mined zones; of position-finders suited to the locality, for determining ranges and controlling the fire of the guns and the operation of the mines from the station of the commanding officer; of suitable arrangements for sweeping the approaches by the electric light, and for using movable torpedoes under control from the shore."

Applying this scheme to the harbor of New York, for example:

Sandy Hook, Coney Island, Staten Island, Fort Schuyler and Willetts Point suggest themselves as the sites to be fortified. We will assume as an illustration the following, as necessary for the complete defense of New York harbor, viz., Sea coast fortress for mounting two 16-inch guns, twenty 12-inch guns and forty 12-inch mortars; four hundred mines with their cables, etc., complete; two operating casemates for these mines with cable shafts, etc., and one "keep" with flanking arrangements for the batteries.

The estimated cost of such defenses for the harbor is about \$3,300,000.

It is not the policy of our government to fortify on so extensive a scale as this, all at once, but it has commenced a good system of defenses on a more economical and progressive scheme in our principal harbors, and in the course of a few years, by moderate appropriations, it is proposed to make our land defenses adequate to stand off any naval vessel afloat.

The statesmen of the country of all parties seem to have recently awakened to the necessity for some adequate provisions for protecting certain harbors where centre the wealth, trade and commerce of the nation, and which a few years ago had come to be at the mercy of any maritime enemy, through our inaction in the matter of defenses, during the age of transition from smooth bore guns and masonry armor, to high-power rifle guns and iron armor. Fourteen strategical points naturally suggest themselves for fortifications, Portland, Me., Boston, Newport, R. I., New York, Philadelphia, Baltimore, New Orleans, San Francisco, the Lake Ports, Hampton Roads, Virginia and Washington, D. C.

It is proposed to extend appropriations over about 10 years, making an annual expenditure of only about two-tenths of one per cent. of the destructible property involved. It is the business view of the situation, to expend this as an insurance premium. A more important consideration is in the national humiliation that we invite, by leaving our ports in an unprotected condition while the rest of the world is actively awake.

The subject of national defences cannot be treated here in detail. It is only the intention to outline it sufficiently to call the attention of young men who are soon to come into business and political positions of the country, to a subject that the public generally have given very little attention during these latter years of our prolonged peace, but which must receive more attention if we wish to make this peace secure and perpetual.

Several times during the past ten years the prominent officials of the government have had to admit their anxiety lest some of the smaller powers, with which we have had diplomatic differences, should send ironclad vessels into our ports and exact a heavy tribute under threat of laying the cities in ashes, which they could easily have done. Though we are at peace with the world, it cannot be disputed that there is much latent hostility against us among foreign nations.

We must be mindful or our foreign policy will lack self-respect and our government be humbled in its diplomacy.

SUBMARINE MINES AND TORPEDOES.

Torpedoes and submarine mines have come to be important factors in harbor defences.

There is a torpedo school at Willetts Point, New York Harbor, under the management of the Engineer Corps of the Army. Here an admirable system of submarine mines and torpedo defence has been perfected, which is fully abreast with modern science.

The general term *torpedo* is used in a military sense to designate all contrivances for producing explosions calculated to act destructively against an enemy coming into their immediate vicinity. They are used as auxiliaries to land batter-

ies for obstructing rivers and entrances to harbors, and are either stationary or capable of movement. When stationary they are called *submarine mines*, leaving the term *torpedo* for moveable combinations of this nature.

SUBMARINE MINES.

Submarine mines may be classed under two heads, viz.: *mechanical*, those which depend for their explosion upon mechanical means, such as the percussion of a vessel coming in contact with them; and *electrical*, those which are fired by electrical agencies either by the vessel closing the circuit, or at will, from the shore. The former class have only a limited use as, when in place, they make the channel equally impassable to friend and foe, but they have the advantage of being simple in construction so that they may be handled and planted by ordinary workmen.

The second class are under perfect control and may be rendered harmless at any time, by cutting out the battery, but they require a certain amount of technical knowledge for their manipulation.

They are *buoyant* or *ground mines*, depending upon whether they are anchored from or rest upon the bottom. When the water is shallow, ground mines are used, but for depths beyond forty feet the buoyant mines would be necessary.

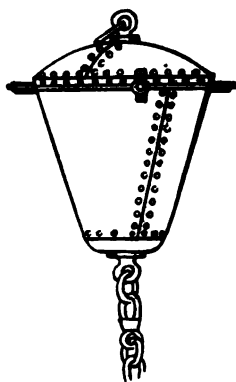


Fig. 24.



Fig. 25.

Fig. 24 illustrates a buoyant mine and Fig. 25 a ground mine in place under water. The cases are usually made of metal; they must be water tight and are cylindrical, conical or spherical in shape.

The explosives used are gunpowder, dynamite and gun cotton, dynamite being the one now most extensively used. The charges range from 100 to 500 pounds.

A single torpedo with 200 pounds of dynamite, if favorably applied, will smash the armored ribs of the greatest war ship in the world, and the mere suspicion of submarine mines makes a hostile fleet timid, if not sufficient to prevent war ships from attempting to enter a harbor till it has been explored and cleared of these hidden obstacles. The same as with land mines, the moral effect constitutes their greatest efficiency. Our system of sub-marine mines probably does not differ essentially from the German, French, English or Russian. The construction of the firing box, however, and the circuit-closer in the mines are kept *confidential*, to be known to only one or two except commissioned officers. These secrets, however, are of a technical nature and do not prevent becoming familiar with the general methods. So the history of the torpedo or mine may be followed from its beginning in the steel shop, through its loading, laying, grouping and testing, till it finally discharges and does its work—all this without violating any official secret.

One secret is, however, guarded with zealous care and is known only to a few engineers of the highest rank and the high officials of the War Department. This is the *hydrographic survey* of our harbors, with the plotting of the torpedo fields as they would be laid in preparation for active war. A plan has been carefully worked out for each important harbor in the country.

The problem involved in arranging any system of mines, for the defence of a channel, contains so many conditions that it is impossible to give more than a general suggestion concerning its solution. As far as practicable no indication of the position of a mine should appear on the surface of the water and yet the spot to within a few feet of where it is deposited must be known to the defenders of the channel. Mines are located by instruments on shore. They must be so placed that a vessel passing along the channel will at some moment, whatever course she may take, come within the radius of destructive effects of one of the mines. This is generally attained by placing the mines in several rows across the

channel, the mines of each row being opposite the intervals of the others, something as shown in Fig. 26. The rows of the mines are from one hundred to two

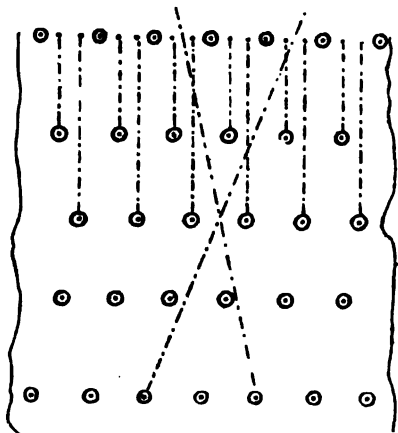


Fig. 26.

hundred yards apart, depending upon the size and nature of the explosive charge. Buoyant mines should be moored so as to float from ten to forty feet below the surface, depending upon the depth of the channel and the size of the boats likely to pass.

Mechanical mines are fired by means of percussion nipples or caps which explode upon contact with a vessel. Electrical mines are fired by means of an electric fuse, which is connected with a galvanic battery, electric cables being used to connect with the operating casemate of the fort.

TORPEDOES.

As previously stated, the term *torpedo* has a general meaning embracing submarine mines, together with all machines for destroying ships by blowing them up, but in its restricted, *technical* sense it is applied to missiles fired under water, either from shore or from boats.

There are two classes, *controllable* and *uncontrollable* or *fish* torpedoes.

The first class, of which the Patrick torpedo, Fig. 27, is a representative, carry within themselves engines that supply their motive power and are steered from shore by means of either one or two electric cables.



Fig. 27.

The engines may be driven by compressed air, carbonic acid gas, or electricity supplied from shore along the cable.

There are several kinds but they are similar in construction. They are all cigar shaped and in moving are kept a few feet under water by means of a buoy or float, to which they are firmly attached and which is similar in shape to the torpedo, but a few feet longer. These torpedoes are about two feet in diameter, vary in length from 20 to 35 feet and carry from 100 to 500 pounds of dynamite or gun-cotton, as an explosive charge. Two flags or metallic balls are attached to the buoy so that its direction can be followed by the operator on shore. Their range is limited by the length of cable that can be carried, and means for observation. Two miles is their extreme range.

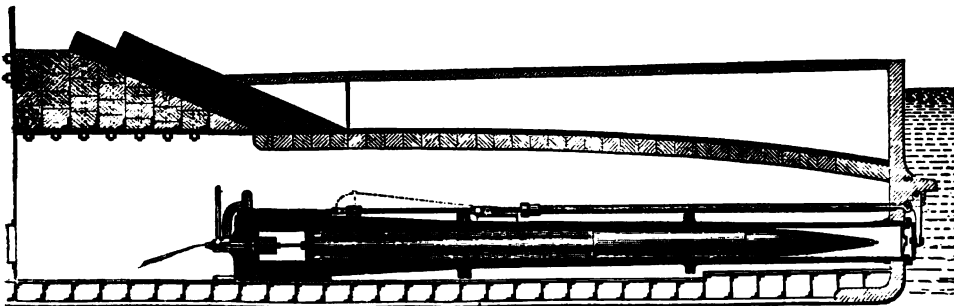


Fig. 28.

Figure 28 illustrates the second class or *projectile torpedo* as it is fired from a tube built in a vessel. The shell of the torpedo is usually brass and

most of the other parts steel. Nearly all recently constructed warships are equipped with torpedo tubes. Their range is less than $\frac{1}{2}$ mile.

ELECTRICITY APPLIED TO WARFARE.

Mechanical and electrical engineers are to find extensive fields for the application of their knowledge in modern warfare.

Besides the electric telegraph and telephone service conducted by the Signal Department, and the electrical appliances for firing large guns, submarine mines and torpedoes, the employment of the *electric light* has a growing prominence in warfare. This is not, however, an entirely new idea. It was used in the Crimean War, 1855, to light up the point of attack, and in the Siege of Paris, 1870-71, the electric searchlight was used by both sides with much effect. But it is within the past few years that especial attention has been given to that portion of warfare which may be said to *begin* at night.

The principal uses to which electric lights are now put for war purposes may be classified under the following heads :

1. First-Class Lights for Fortresses, Coast Defences, War Vessels and Submarine Mining Operations.
2. Semi-Portable Lights for Embarkation, etc.
3. Portable Lights for Field Operations.
4. Portable Lights for Land Mining Operations.
5. Signaling by Electric Light.

To deal with all these subdivisions of the subject in detail in the course of a short lecture upon this class of subjects would be too comprehensive an undertaking. It is only proposed to outline them in a suggestive way to those who are interested to pursue them.

The question of first class lights for fortresses is receiving much attention the world over, and their introduction into naval vessels is an accomplished mine fields, they have long been used. For night embarkations of troops and stores on board ship or into trains, the ordinary commercial arc-lamp and portable engines fulfill the purpose, without re-

quiring any special adaptation as war measures. The use of portable electric lights for field operations is now receiving attention and development. We may take for granted that a besieging army will find any permanent fortress against which it may be engaged, equipped with electric lights with which to search out the night operations conducted against it, so that the seige of a fortified place will no longer be the comparatively simple operation of constructing works at night and firing from them during the day. This disadvantage on the part of the attack is to be counteracted by the employment by them, of electric search lights.

It has been shown that when the atmosphere is at all heavily laden with smoke or with mist, the penetrating power of the light of a fortress can be diminished by the employment on the part of the attack of another beam crossing the former at an angle. Therefore the electric lights will produce cover behind which, parallels or seige batteries can be commenced by the attacking force in spite of the search lights operated by the defenders of the fortress.

The appliances for these field lights must be portable, so that they can be transported with armies, after the manner of seige and pontoon trains.

The things required to produce a search light are :

1. A boiler.
2. A steam engine.
3. A dynamo.
4. A lamp.
5. A protector with condensing mirror.
6. Certain small accessories.

Foreign armies, especially the French, German and Italian, already have these equipments in portable forms, mounted on carriages, and also equipments for pack-saddle transportation in mountainous countries. The Russians and English have not made so much progress but are experimenting upon systems for carrying search lights in the field.

The subject of night signals by electric lights both by arc lights and by incandescent lamps is also receiving attention, but is at present in an experi-

mental stage, and is a subject interesting not only to the specialists of the Signal Corps, but to the army at large.

ORDNANCE DEPARTMENT.

This department conducts the manufacture and supply of arms, ammunition and accoutrements for the infantry; guns, carriages, harnesses, ammunition and equipments for the artillery and cavalry, including all such utensils as knapsacks, haversacks, canteens, tin cups, meat ration cans, spoons, knives and forks.

The chief of ordnance ranks as a brigadier general, and is stationed at Washington, D. C. The other officers consist of three colonels, four lieutenant colonels, ten majors, twenty-four captains, and twelve first lieutenants who are stationed at the various arsenals and ordnance depots throughout the country. Besides these commissioned officers the department contains sergeants, corporals and first and second class privates. These are largely skilled men employed about the arsenals and depots.

SMALL ARMS.

The term *small arms* is applied to those weapons which are discharged from the hand, in contradistinction to *cannon*, which is applied to heavy fire-arms discharged from carriages.

Small arms are spoken of as *hand arms* and *projectile arms*.

The hand arms down through the different ages, have comprised the war club, battle axe, pikes, swords and sabres. The pike, in the form of a bayonet on the infantry rifle, the sword and sabre are all that are now in use in our army, though in nearly all foreign armies the lance is used by a portion of the cavalry.

PROJECTILE ARMS.

The early projectile arms were the sling, bow and cross bow, but since the invention of gunpowder about the middle of the fourteenth century, portable *fire-arms* of some form have been in the hands of troops.

Figure 30 illustrates the first rude hand gun, consisting simply of a tube of iron or copper, fixed in a straight stock of wood, touched off with a match.

These guns weighed from 25 to 75 pounds each and the larger ones were worked by two soldiers, one resting the muzzle on his shoulder and the other applying the match to the vent.



Fig. 30.

A *forked rest* was also used for the muzzle, so that one man could manipulate the weapon. The match was first applied at a vent on top, and the first step at improvement was to place the vent on the side with a pan to hold the priming. This led to the gun known in 1517 as the *matchlock*. Later came the *wheellock* and in 1630 the *flintlock*.

The English flintlock, "Brown Bess," figured in the early Indian wars and the Revolution in this country, in the Napoleonic wars, and down to 1830.

The *percussion cap* came into use in 1840 and was in use during the Mexican war. Rifled fire-arms came into use between 1850 and 1860 and were used in the war of the Rebellion. Breech-loading guns were used to a limited extent in this war, but the Franco-German war of 1870-71 was the first war really fought with breech loaders. The single loader is now rapidly giving way to the repeating or *magazine gun*.

CANNON.

The early cannon were cylinders, constructed by binding together bars of iron with hoops after the manner of a barrel, which were terminated at the bottom by smaller cylindrical chambers for the powder. See Fig. 31. The projectiles were stone balls principally employed to breach stone walls.

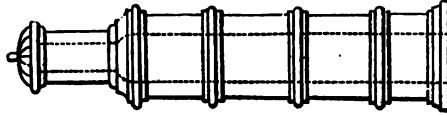


Fig. 31.

Bronze soon came into use in gun making, and was continued for field artillery even through our war of secession, but the stone balls were early superseded by spherical iron projectiles.

Nearly all modern cannon are of built-up steel, they are rifled, load at the breech and fire oblong steel projectiles.

PROJECTILES.

Until 1860 all cannon were smooth bore, firing spherical balls, and until quite recently they were also muzzle loaders. Muzzle loading and smooth bore cannon have now become obsolete, as effective weapons, consequently spherical projectiles will not be here considered in detail, as they cannot be used in rifled guns. The grape and canister heretofore used in smooth bore cannon, for repelling an assault, will probably in the next war be superseded by showers of bullets from machine guns. These machine guns have oscillating movements which make their fire more destructive than grape and canister and a terror to assailants in an open field.

Projectiles may be classed either as *shot* or *shells*; they are made of chilled iron, cast steel, chilled steel, and hammered and tempered steel. Steel projectiles are very expensive but have proved superior to all others, against armor plates which are coming into use for land defences, as well as to cover navy vessels. Modern cannon projectiles are oblong and from $2\frac{1}{2}$ to $3\frac{1}{2}$ calibers in length, and receive a rotary motion about their longer axis, from the rifling of the gun.

Spherical shot and shell will of course continue in use with smooth bore guns, which must constitute the armament until the new model guns can be supplied.

SHOT.

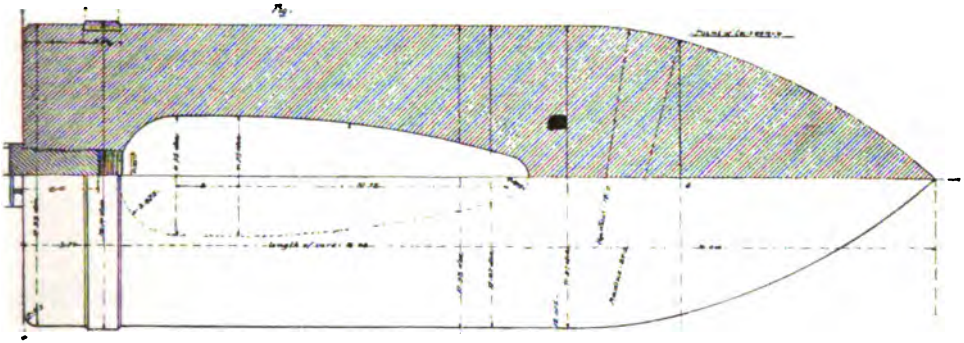


Fig. 32.

These are either solid, or *core shot*, for battering and piercing armor. Figure 32 illustrates the core shot for the 12-inch rifle. It has a small cavity near the rear end of the projectile which serves to throw the center of gravity well to the front, the aperture being closed with the screw plug as seen in the cut.

SHELLS

These are of the same general form and shape as the shot, but made hollow and filled with a bursting charge, so that the fragments will do execution. They are also made with thinner walls and filled with bullets, incendiary fire, etc., to be scattered by a bursting charge. In the latter case they are called Shrapnel: see Fig. 33.

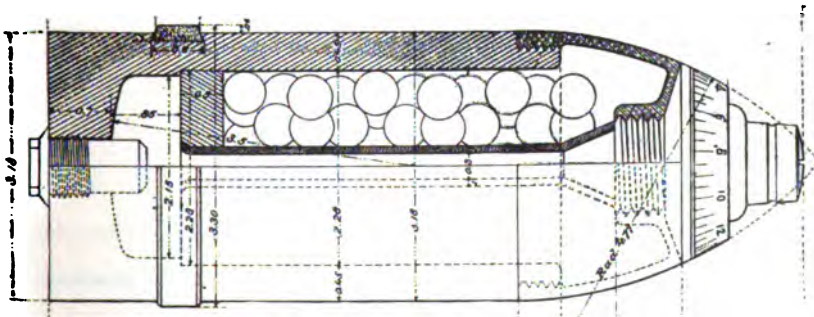


Fig. 33.

Canister shells have an envelope only strong enough to hold the small bullets together during the operations of loading and while in the bore of the gun, allowing them to scatter as soon as they leave the muzzle. See Fig. 34.

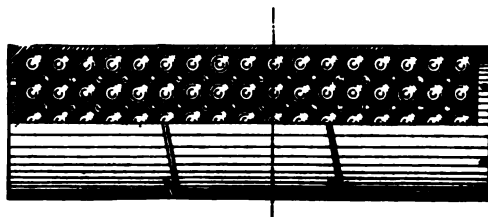


Fig. 34.

Both shot and shell are caused to take the grooves of the cannon by having a rim of softer metal somewhere near the base, of a slightly greater diameter than that across the lands of the rifling of a cannon. A shell is burst by means of a fuse, shown at the head of the shell illustrated in Fig. 33. There are various kinds of both time fuses and impact fuses, so that a shell may be made to burst at any time during its flight or upon impact at its destination. There is also a combination fuse which gives a double chance in bursting the shell.

REVOLVING OR RAPID-FIRE GUNS.



Fig. 35.

There are several varieties of this class, such as the Driggs-Schroeder, Hotchkiss, Nordenfeldt, etc. They are larger than the class known as machine guns and use steel projectiles, the largest of which weigh from two to four pounds, and are thrown at the rate of sixty per minute. Their use is especially adapted

to modern vessels of war, against torpedo boats and for sweeping the decks of an enemy's ship. Fig. 35 illustrates the Driggs-Schroeder Rapid-Fire gun.

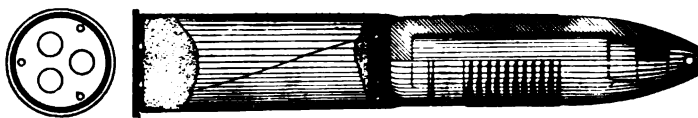


Fig. 36.

The larger models of these guns are coming into use on field artillery carriages. They differ, however, from the ordinary field gun in that the ammunition is "fixed," that is, the charge and projectile are secured in a metal case, something like the small arm ammunition. See Fig. 36. They are automatic only in the ejection of the empty cartridge-case and the cocking of the piece by the opening of the breech after firing. A complete round of ammunition for these guns should not exceed a weight that can be handled by one man. The 6 pounders can be fired with fair aim as fast as fifteen shots per minute.

EXPLOSIVES.

Explosives contain carbon, oxygen, and nitrogen. *Explosion* consists in disturbing the equilibrium of these ingredients, usually by heat, and converting them instantaneously into gas; the carbon and oxygen uniting to form carbonic acid gas and nitrogen being set free.

Explosives are divided into two classes: (1) *Mechanical Mixtures*, e. g., Gun-powder, the explosion of which is by combustion of the individual grains, progressively, and (2) *Chemical Compounds* to which class all the *High Explosives* belong. In these the elements being in chemical combination, can only be separated by chemical change, consequently their explosion is not by progressive combustion but by all the parts decomposing simultaneously, causing the initial pressure to be a maximum one.

GUNPOWDER.

Gunpowder was discovered accidentally by a German, Berthold Schwartz, about the middle of the 14th century. He appears to have been engaged in

experiments with sulphur, charcoal and salt-petre, and left the mixture in an apothecary's mortar covered with a large stone. It accidentally caught fire and exploded, throwing the stone to a great distance. This suggested the idea of using a mixture of these three ingredients as a projectile force and led to the production of gunpowder. The proportions of the ingredients used for black powder have usually been

Saltpetre	76 per cent.
Charcoal	14 “
Sulphur....	10 “
	<hr/>
	100

Gunpowder explodes at 572° F. and great care must be used in handling, storing and transporting it. Wooden barrels are used and implements of wood or copper. Guns, swords or any implements of steel or iron that might occasion sparks must not be carried to a magazine or where there is loose powder. Men must take off their shoes or wear socks and when powder barrels are to be rolled cloth or carpet should be spread.

HIGH EXPLOSIVES.

These owe their explosive force to the action of nitric acid upon cellulose, wood-fibre, glycerine, etc. Each is formed by introducing into a body composed of oxygen, carbon and hydrogen, nitrogen in feeble combination with oxygen, in place of part of the hydrogen. The nitrogen holds the oxygen so feebly that a slight disturbance of the equilibrium brings into action the stronger attractions of the carbon and hydrogen for oxygen.

The number of high explosives is very large, but as distinctive types in actual use we need perhaps only mention the following: Gun-cotton, Nitroglycerine, Dynamite No. 1 and Blasting gelatine.

The following is a table of their specific pressures, compared with gunpowder, as given by Commander Barber:

Gunpowder	1
Dynamite No. 1	13
Gun-cotton.....	14
Nitro-glycerine	16
Blasting Gelatine	17

GUN-COTTON.

This is merely clean cotton subjected to a mixture of nitric and sulphuric acid. The sulphuric acid acts simply in taking up the water and preventing the nitric acid from destroying the fibre of the cotton and does not enter into the compound. Gun-cotton explodes at 360° F.

NITRO-GLYCERINE.

This was first called blasting oil. It is an oily and almost colorless liquid, (though slightly yellow) of a sweet taste, formed by the action of a mixture of nitric and sulphuric acid upon glycerine at a low temperature. As in the case of gun-cotton, the sulphuric acid does not enter into combination. Nitro-glycerine explodes at 365° F., is not affected by water and freezes at 40° F. It is comparatively safe when frozen.

It was found that liquid explosives like nitro-glycerine unless frozen were too dangerous to manipulate and store. This led to the invention of dynamite, which is simply nitro-glycerine mixed with some absorbent, thereby making it a solid body.

DYNAMITE.

Dynamites are divided into two classes.

1. In the first class the absorbent of the nitro-glycerine is inactive, e. g. *Dynamite No. 1*, which consists of 75 per cent. clear nitro-glycerine and 25 per cent. infusorial earth. This dynamite is a loose, soft, readily moulded substance, of buff color. It freezes at 40° F.

2. In the second class of dynamites the absorbent is itself an explosive substance such as the nitrates of potassium and sodium, resin, wood fibre, etc. Of this class the most powerful is

BLASTING GELATINE.

This is formed of 92 parts nitro-glycerine and 8 parts collodion gun-cotton. It becomes a solid, is an elastic, pale yellow substance, can be cut with a knife and formed into any shape. It is not affected by water and does not require any particular care in handling or transporting.

Nearly all of the high explosives if in small quantities, and not constrained, burn slowly without explosion. It seems to require a quick impulse to upset the equilibrium of the atoms, and to obtain the fullest effects detonating caps or nipples are necessary—those composed of fulminate of mercury being the best.

FULMINATE OF MERCURY.

This is the agent employed for igniting other substances and is used mainly in percussion caps, nipples, primers, fuses, etc. It is formed by the action of mercury, nitric acid and alcohol. When dry a violent explosion is caused by a blow, by a spark or by 366° F. of heat.

SMOKELESS POWDER.

For nearly five hundred years, and until quite recently, black powder has held its own against every other explosive for war purposes. And while it cannot be said that high explosives have now regularly entered into warfare, yet smokeless powders have come to be recognized the world over, as factors which must upset pre-conceived theories and revolutionize old methods. General Wolseley, of the British Army recently said, "To excel, the general must be ahead of his adversary in tactical knowledge and his application of modern inventions. He must train his army and prepare it tactically for a warfare to be waged with high explosives, magazine arms, balloons, the electric light and cycles."

All European nations have now a so-called smokeless powder in use, with small arms and rapid fire guns, though for heavy ordnance it is yet in an experimental stage. Many of the foreign smokeless powders are carefully guarded secrets, and the proportions of their ingredients cannot be accurately determined,

yet it is generally understood that nitrated-cotton is the basis of nearly all of them. Some contain 94 per cent. gun cotton, 5 per cent. nitro-glycerine and 1 per cent. castor oil.

As nearly all the *new powder* is converted into gas, only about one-half by weight of the former charge of *black powder* is now used in a cartridge, and this amount gives a vastly augmented chamber pressure and increase in velocity, and enables the reduction in calibre of small arms from .45 to .30. In the new cartridge only 32 grains of the new powder are used, against 70 grains of black powder in the old cartridge, with a bullet weighing but 220 grains against the 500 grain bullet of the old cartridge.

This reduces the entire weight of a cartridge about one-half, and enables the soldier to carry twice as many as formerly. "Smokeless powder" is simply one which produces a very light cloud, not of smoke, but of bluish vapor which disappears almost immediately and is not sufficient to obstruct the vision in aiming.

The difficulties in the production of smokeless powders are the apparent impossibility of insuring the explosion being controllable and uniform, and the uncertainty as to how far storage will affect these indispensable qualities. It is quite certain that smokeless powder cannot entirely superseded gunpowder, until it has gone through the practical test of storage, in varying and extreme climates, for a long series of years. The best authorities state that smokeless powders, as a general rule, are not affected by moisture, but that they are to a greater or less extent influenced by heat.

In few paths of science has progress been more marked than in the development of materials of war. Half a century ago, the heaviest guns weighed only about five tons and fired with a charge of 20 pounds of powder, a spherical projectile weighing only about 70 pounds, to which was given a velocity of about 1500 feet per second, a ballistic effect equal to an energy of 1060 foot-tons.

The heaviest guns of the present day fire a projectile weighing 1800 pounds with a charge of 850 pounds of powder and a velocity 2100 feet per second equivalent to an energy of 55,000 foot-tons.

The question now arises how far our present guns are suited to the new smokeless powders, and to what extent they must be changed in order to reap the full advantage of these new powders.

The results recently obtained from smokeless powder in France and Germany point to still farther revision of the system of gun construction.

SIGNAL CORPS.

This corps comprises besides the chief signal officer at Washington, D. C., who ranks as brigadier-general, one major, four captains, four first lieutenants and fifty sergeants. The officers of this corps have charge of the construction, maintaining and operating military telegraph and telephone lines, and the procurement, preservation and distribution of such supplies as are required in the signal service of the Army.

In time of peace, military telegraph and telephone lines are maintained, in the Western frontier country, connecting the military posts with the nearest commercial lines, and the signal sergeants are detailed as operators.

At the various military posts "line officers" are detailed as acting signal officers, who have charge of the signal equipments and instructions pertaining to the post. All officers and a portion of the men of each company, troop or battery, are required to be proficient in the exchange of the day and night signals by flag, torch and other devices, so that communication can be kept up between parties on shore and water. The equipments are all packed together, constituting the kit, to be carried by a soldier either mounted or on foot.

Previous to receiving instruction in the use of the flag and torch, men should be instructed in the infantry drill regulations to include the school of the soldier and company.

The drill for field telegraph trains may be found in the "Manual for Signals" issued by the Chief Signal officer of the Army.

SIGNAL CODE.

The Morse telegraph code, *heretofore given, has since October 1, 1896, been replaced by the Myer code formerly used, which is as follows:

A,.....	22	O,.....	1
B,.....	2112	P,.....	1212
C,.....	121	Q,.....	1211
D,.....	222	R,.....	211
E,	12	S,.....	212
F,.....	2221	T,.....	2
G,.....	2211	U,.....	112
H,.....	122	V,.....	1222
I,.....	1	W,....	1121
J,.....	1122	X,.....	2122
K,.....	2121	Y,.....	111
L,.....	221	Z,.....	2222
M,.....	1221	&,.....	1111
N,.....	11	ing,	2212
		tion,	1112

3—End of a word.

33—End of a sentence.

333—End of a message.

22.22.22.3—Signal of assent: "I understand," or "message is received and understood," or "I see your signals," or affirmative generally.

22.22.22.333—Cease signalling.

121.121.121.3—Repeat.

21.21.21.3—Error.

211.211.211.3—Move a little to the right.

221.221.221.3—Move a little to the left.

Flag waved successively from side to side until attention is attracted—"Attention, look for signals from this point."

*Lecture No. 2, page 37.

NUMERALS.

1. 21112—Wait a moment.
2. 12221—Are you ready?
3. 22122—I am ready.
4. 22212—Use short pole and small flag.
5. 22221—Use long pole and large flag.
6. 12222—Work faster.
7. 11222—Did you understand?
8. 11112—Use white flag.
9. 11211—Use black flag.
0. 22222—Use red flag.

When the numerals are used in transmitting messages as code signals, they have the meanings given above, opposite each character.

a—after.	b—before.	c—can	h—have.
n—not.	r—are.	t—the.	u—you.
ur—your.	w—word.	wi—with.	y—why.

The first position is with the flag held directly above the head of the flagman.

To make the first motion, or “one” or “1,” the flag, being at the first position, is waved to the ground to the right, and instantly returned to the first position.

To make the second motion, or “two” or “2,” the flag, being at the first position, is waved to the ground to the left, and instantly returned to the first position.

To make the third motion, or “three” or “3,” the flag, being at the first position, is waved to the ground directly in front of the flagman, and instantly returned to the first position.

TO SEND A MESSAGE.

First call “attention” by waving the flag successively from side to side, until it is seen and answered by the opposite station. The station called will “answer”

by making 22. 22. 22. 3, the general signal for assent or affirmation, to signify that it is ready to receive the message. The communicating station then makes 22. 22. 22. 3, signifying, "I see you are ready to receive the message," and then proceeds to transmit the message, letter by letter. A pause is made at the end of each letter. At the end of each word, the flag is waved to the ground, directly in front ("3,") to show that the word is finished. At the end of each sentence, there is a pause, and the flag is waved to the ground twice, directly in front ("33,") to show that the sentence is finished. At the end of a message, the flag is waved to the ground three times, directly in front ("333") showing that the message is finished.

When the signal "333," "end of message," is made, it indicates, "My communication is complete; I await your answer." The station receiving the message will, upon noticing the signal "message complete," if the message has been correctly received, immediately answer with the signal of assent, "22.22.22.3;" and will then, if the sending station has finished, signal in turn such messages as it may have to communicate. If, however, the message, or any part of it has not been correctly received, or is not understood, the receiving station will make the signal for "Repeat," "121.121.121.3," followed by the part of the message to be repeated, as "121.121.121.3 after or before the word—(here signal the word after or before which the repeat is required)." If the message is not understood at all, the signal "121.121.121.3—all" is made. In commencing a repetition, the sending station will always commence by making the "signal of assent," to show that the call for "repeat" is understood.

This "signal of assent," meaning "I understand," will be used habitually at the commencement of all communications.

When, in the transmission of a message, a mistake is made, as may happen by the error of the signalist or of the flagman, the "error signal" "21.21.21.3" is made. The sender then, beginning with the letter in which has been the error, signals it correctly, and proceeds with the message.

In telegraphing with the Myer code, the signal-numerals thereof are transmitted by blows of the key, like the dots of the Morse alphabet, one blow indicating

the numeral 1, and a double blow (two blows made without interval) the numeral 2. It is received by sound, the stroke of the armature of the magnet making the sound. Three blows or strokes, without interval, is full stop, and is the only punctuation mark used.

PIGEONS AS MESSAGE CARRIERS.

The love of home and the habit of returning there when set free in a strange land is a characteristic feature of many birds and animals. The acute horseman first goes to look for his stray horse where the animal was raised or previously kept and dogs are much used for carrying messages home to their owners. But this quality in the pigeon has become the most useful to man, because the most susceptible to his control.

These birds are generally known as "Carrier Pigeons," though in the different countries they pass under various conventional names; for instance in England and America they are called "Homing Pigeons," in France "Voyageurs," and in Germany "Brieftauben."

The most extensive use of the pigeon for war purposes was probably during the Franco-German war of 1870 and 1871, when the balloon and pigeon services were combined to open communication with the French who were besieged in Paris.

The birds were carried into Paris in balloons over the heads of the German besiegers and when let loose returned to their homes over a distance of 150 miles. The messages were attached to the tail feathers in such a manner as not to be readily observed unless the birds were caught and carefully examined. These messages were reduced by photography so that long despatches could be placed in a single quill, without offering impediment to the bird's flight. The French Army has now a regularly organized "carrier-pigeon corps."

The military lofts of Germany are very complete and the government encourages pigeon flying as a national sport. In Belgium this is a national pastime to such an extent that nearly one-fifth of the people are pigeon-fanciers, and "pigeon lofts" are characteristic features of the dwellings. Millions of these

birds have been carried from Belgium into France in a single year to be liberated, and in returning they have flown 215 miles at a rate of speed exceeding one mile per minute, for the whole distance.

During the past twenty years considerable has been done in this country in an experimental and sporting way in pigeon flying. Gentlemen take birds from their home lofts in the city, to their suburban residences to use in returning messages.

The birds are susceptible of education and the impulse and ability to return home over long distances is attributed to a certain degree and kind of intelligence and not alone to instinct or intuition.

Pigeons whose homes were in Hoboken, N. J., are reported to have returned within a little over eight hours after being liberated at Steubenville, Ohio, a distance of over 340 miles, and a flight has been made from Montgomery, Ill., to Fall River, Mass., some more than 1,000 miles in twenty hours. The attachment of the pigeon seems to be for his home and loft, rather than for mate or young. There are many theories advanced by scientists in explanation, but those who have given the subject the most study say that it is due to keen sight and wonderful memory, directed by intelligence, that the pigeon is able to answer to its ruling impulse, and return to its loft over long distances.

They not only err, but show indecision when liberated in a strange place, and many fail to accomplish their journeys. They fly about for a while and if not able to take the direction, return to the place where they were liberated. After a time they start again and take wider circles, until all at once they seem to discover the direction, and then take a straight course towards their homes.

MILITARY BALLOONING.

France has a Balloon Corps in her army, and England has within the past two years formed a "balloon depot" and "balloon section," the former consisting of one instructor in ballooning, a mechanist, a clerk and six other grades, and the latter a captain, 2 lieutenants, 1 Co. sergeant major, 1 sergeant and 23 other ranks. The section is accompanied by a train of wagons for carrying balloons,

anchor-wire, gas tubes and other apparatus. Germany, Russia, Italy and the less important military nations are supplied with aeronautical apparatus, schools of practice, etc., and many have plants and experiment stations, where work is conducted more or less secretly upon power-driven air ships.

Our government has so far done little to develop ballooning, though private enterprise in this country keeps up experimenting, and in the event of a war, we should undoubtedly call these valuable aids into use under the management of the "Signal Corps" of the Army to which they would naturally pertain.

Some prophecy the use of balloons in the hands of skillful navigators for sailing over the enemy, to drop among them inflammable compounds and destructive explosives, deadlier in their results than dynamite and other substances that can be thrown from a cannon.

But the most reliable aeronautic service will probably be in the use of "captive balloons" for reconnaissance and observation within our own lines, or as near the enemies' lines as it is practicable to go, the great use in the field being to supply information as to the disposition of the enemy's forces before the engagement commences and giving details as to the position of his camps and his works, and during the fight in observing the effect of artillery fire so that it may be corrected, and the general progress of the battle. It is even likely that commanders will issue their orders in many cases from balloons, when they themselves can observe large areas and telephone instructions to their staff officers on the ground.

Although expensive, hydrogen seems to be the best gas for military purposes, its lifting power being from 60 to 68 lbs. per 1000 cubic feet.

The capacity of the war balloons is from 10,000 to 19,000 cubic feet, so that besides the wire rope necessary to anchor them to the ground and the necessary appliances, a balloon will carry two or three light men in the air at a height of 500 yards. The rope or cable answers the purpose both of a guy and means of communication with the ground.

It is made of several strands of wire enclosing in the center an insulated wire for telephonic use. The rope used may be less than one inch in circum-

ference, weighing only about one ounce per foot, and still have a breaking strain of one ton. Messages are sent by means of a bag and sliding ring on the wire as well as by telephone. The English supply the gas ready made from tubes carried in wagons. Other nations carry the plant and material for making the hydrogen in the wagons.

POST CHAPLAINS.

This corps contains 30 officers and in addition to these, which are officially designated "Post Chaplains," the four colored regiments of the Regular Army have each a regimental chaplain. All of these chaplains rank as captains of infantry.

They are appointed by the President from civil life and must be regularly ordained ministers of the gospel. In addition to their religious duties at military posts, where they are stationed, they usually superintend post schools which are provided for the children of officers and soldiers, as well as for enlisted men. There not being as many chaplains as there are military posts, they are usually assigned to the larger ones and those located where there is the best field for their labors. In time of war each regiment has a chaplain, and the regimental organization of "volunteers" and "militia" usually contains a chaplain in its list of staff officers.

RETIRED OFFICERS AND ENLISTED MEN.

Officers are retired upon three-fourths pay of their grade, at sixty-four years of age or upon becoming disabled in line of duty, and after thirty years' service they may be retired upon their own application, at the President's discretion. Upon retirement officers are withdrawn from command and from line of promotion. They are, however, entitled to wear the uniform of the rank upon which they were retired, continue to be borne on the army register and subject to rules and articles of war and to trial by general court-martial for any breach thereof. They are not assignable to active duty except at certain places, the Soldiers' Home, colleges, etc., and are at liberty to reside at such places as they wish and if they so desire engage in business or receive appointment to civil office.

Enlisted men who have served as such thirty years, either in the Army, or the Marine Corps and the Army, may upon their application be placed upon the retired list, and receive three-fourths of the pay and allowances of the grade held when retired.

THE UNITED STATES MILITARY ACADEMY.

All the principal nations of the earth consider it necessary to support national military schools for supplying educated officers for their armies. While most of the principal nations have several, we have but one military school especially devoted to supplying educated officers for our army. This is located at West Point, New York, on the Hudson river, about 50 miles north of New York City.

This historic spot was selected for the purpose by Washington before his death, and in 1802 the Military Academy of the United States was established there by an act of Congress. The institution is supported by an annual appropriation by Congress. It is not sustained as a charitable institution, but rather as an educational investment from which the government expects large returns in case of war, and from which, in times of peace, military training may revert to other institutions of learning and to the militia, through graduates from the Military Academy being assigned as instructors. It is generally conceded to be one of the best military schools in the world, and for an all-round military education it is by many pronounced the best. The schools of Europe are usually confined to specialties, while all officers are educated at West Point for all branches of the service alike. They are thus broadly equipped for occupying high commands, embracing all "arms" and corps.

There are seven permanent professors authorized by law, having the rank and pay of lieutenant colonel during their first ten years' service and afterwards the rank and pay of colonel. The other officers are assigned by the President, from the army, and changed once in about four years. The chief officer of the institution is styled *Superintendent* and while so serving is the head of the Academic Staff. The next in authority is the *Commandant of Cadets*. The cadets

are appointed by the Secretary of War upon the recommendation of the Members of Congress from the districts in which they reside. Each Congressional district and Territory, and the District of Columbia, is allowed one cadet and the President is also authorized to make ten appointments at large, so that the number of cadets is now limited to 347.

The cadets constitute a part of the army, and take precedence over all non-commissioned officers, ranking next below second lieutenant. The pay of a cadet is \$540 per annum, from which he purchases his books, clothing, board, etc., receiving only tuition, quarters and medical attendance without charge.

The age for the admission of cadets to the academy is between seventeen and twenty-two years. Candidates must be unmarried, at least five feet in height, free from any infectious or immoral disorder, and generally from any deformity, disease or infirmity which may render them unfit for military service. Congressmen usually select their appointees by competitive examination in their respective districts, and candidates are also subjected to rigid physical and mental examinations upon entering the academy.

The course of study extends through four years, and comprises pure and applied mathematics, English, French, Spanish, drawing and water color painting, philosophy (including mechanics, acoustics and optics), astronomy, chemistry and electricity, mineralogy and geology, military and civil engineering, ordnance and gunnery, science and art of war, constitutional, international and military law, and the drill regulations for all arms of the service. The institution may be considered as noted for its thoroughness of instruction and for its systematic discipline, both physical and mental. The general *practice on the continent of Europe is for the professor to deliver lectures to classes, often numbering 100 or more, after which the students are questioned by interrogatories once or twice a week, perhaps not oftener than once in two weeks or frequently not until the end of a term. At West Point, on the contrary, classes are divided into sections of ten to twelve cadets, and these sections, under the supervision of a professor, are each in charge of an instructor who devotes an hour or an hour and one half

*Upton's Armies of Europe and Asia.

to its recitations daily, Sundays only excepted. By this division into sections, which is the secret of the thorough mental training at West Point, the cadet recites from four to six times a week, while the foreign cadet may escape weeks at a time.

Studies commence the first of September and continue uninterruptedly until about the middle of June. Semi-annual examinations are held in January and June, when those cadets who have not attained a certain standard of proficiency are dismissed. The standard of examinations is so high, that from 30 to 50 per cent. of those who enter fail to graduate, while in foreign schools not more than three or four per cent. fail.

The institution is not only under the close supervision of the War Department but is closely inspected each year by a board of visitors who remain through nearly two weeks of the examinations. This Board is made up of seven prominent men of the country appointed by the President, and of two Senators and three Members of Congress, and detailed reports are rendered to the President and to Congress concerning the discipline and instruction at the academy, to which are added recommendations for the future.

It is claimed that the cadets perform before this board of visitors each year a variety of military manœuvres in engineering and all arms of the service which is nowhere approached or even attempted in Europe. The cadet's uniform is gray. The cadets live in barracks from September to June and during the summer in camp, and for purposes of military discipline are organized into a battalion of four companies. They are marched to meals and to recitations and their rooms are subject to frequent inspection during both day and night. Two cadets room together; their rooms are furnished in a uniform manner and in soldier-like simplicity. It is a most democratic institution where the sons of the poor and the rich must live alike in all respects. No cadet is allowed to keep a horse, dog or servant or have money in his possession, all accounts being kept for him by the treasurer. His food, his exercise, his time for study and sleep are arranged upon a systematic basis from which he cannot depart. He is confined to the limits of a small reservation, and has but one furlough during his four years' course, which lasts for about two months at the end

of his second year. The cadets are, however, in camp and released from study during the two months of summer. Their friends then visit them, they are allowed semi-weekly hops and it becomes a season of gaiety and enjoyment. The life is not considered severe for those who are susceptible to discipline and cut out for the life of a soldier, still it is competitive throughout, and may be considered as a process of selecting the "fittest" for the profession of arms. Only about 33 per cent. of those who receive appointments graduate, the other two-thirds, either fail to report, are rejected at the entering examination or dropped out at the various examinations during the course.

Graduates are commissioned as second lieutenants of the Army, according to their class standing, the highest having choice of the vacancies. The size of the classes varies considerably from year to year and it occasionally happens that a class will be larger than the number of vacancies. Then the graduates are, by law, assigned as additional second lieutenants, to await vacancies.

The matters of gentlemanly and soldierly honor are watched with zealous care by all instructors at the Academy. This is reached, however, rather by indirection, than by severe measures, though the latter are at times applied. There has grown up a sort of unwritten code of honor regulated within the cadet corps. No locks and keys are used in cadet barracks, and a cadet who positively "lies" to an officer will not sleep in barracks many nights after it becomes known to his comrades.

The leading features of our Military Academy have here been outlined in brief because it is the one institution of the country, serving as a model for military education, after which all other institutions having military instruction in any degree must more or less pattern.

MILITARY DEPARTMENTS AT UNIVERSITIES AND COLLEGES.

Besides the United States Military Academy at West Point, which may be considered as strictly a technical military school, the National Government supplies an officer of the army as military professor in 100 of the civil universities

and colleges of the country, apportioned to the several states according to population.

The detail of an office carries with it a supply of Infantry arms and equipments and ammunition for target practice, artillery field pieces and blank cartridges, and, in some cases, where there are facilities for their use, cavalry arms and equipments.

At the outbreak of the War of the Rebellion there were few schools or colleges throughout the northern states where military instruction was a part of the curriculum, and it was at first difficult to find a sufficient number of drill masters, much less competent company commanders for the northern armies. The officers naturally selected as leaders, on account of their recognized standing among their fellows, had to learn tactics as best they could and then teach them to others. Though, in time, some of these officers astonished the world by their military genius and ability, it was expensive work for the Government, and it was felt throughout the country that the Civil War would have been much shorter in duration, and that thousands of valuable lives would have been saved, if our educated young men, who so patriotically enlisted at the first call for troops, had been previously sufficiently instructed in the military profession to have efficiently filled the positions of subordinate officers.

To obviate such a state of affairs in the future our Congress embodied a remedy in what is known as the "College Land Grant Act" of 1862, which provisions gave to such states as would accept the conditions, public lands to the amount of 30,000 acres for each senator and representative in Congress. The money obtained from the sale of these lands was required to form a permanent fund, the interest of which was to be applied to endowing and supporting educational institutions where the leading object should be to teach such branches of learning as are related to agriculture and the mechanic arts and to include "*military tactics*."

Another bill was passed in 1866, which provided "That for the purpose of promoting knowledge of military science among the young men of the United States, the President may, upon application of an established college or uni-

versity within the limits of the United States with sufficient capacity to educate at one time not less than 150 male students, detail an officer of the Army to act as president, superintendent, or professor of such college or university; who shall be governed by the general rules to be prescribed from time to time by the President.

In compliance with the above law the President has made rules to be observed by institutions accepting an officer, as follows :

The practical course in Infantry shall embrace small arms target practice and, as far as possible, all the movements prescribed by the drill regulations of the U. S. Army applicable to a battalion. Instruction in artillery shall embrace as far as possible, such portions of the United States drill regulations as pertain to the formation of detachments, manual of the piece, mechanical maneuvers, aiming drill, saber exercises, and target practice. Instruction also includes the duty of sentinels, and where practicable, castrametation.

Theoretical instruction shall be given by the professor of military science and tactics, by lecture or recitation, in the drill regulations of the U. S. Army, the preparation of the usual reports and returns pertaining to a company, the organization and administration of the U. S. Army, and the elementary principles governing the art of war.

The military department shall be subject to inspection under the authority of the President of the United States, such inspections to be made when practicable, near the close of the college year.

Upon the graduation of each class the officer detailed as military professor reports to the War Department and to the Adjutant-General of the State the names of those students who have shown special aptitude for military service, and the names of the three most distinguished in military science and tactics are inserted in the U. S. Army Register.

CHAPTER IV.

Military Discipline.

Organization, drill and discipline are carried along simultaneously, and it is difficult to draw dividing lines in defining these terms. Organized bodies of men are but mobs without discipline and discipline is acquired largely through drill, which accustoms men to instinctively obey the orders of those placed over them by authority.

The soldier is to become the educated unit in the higher units of a great human machine, which cannot work until all individual units are educated to the same standard of proficiency, and the power that moves this machine is the will of its commander.

Theoretical instruction alone, cannot convert the "recruit" into the "soldier," he must have the actual practice in connection with other soldiers to understand their combined movements. First of all, he must be "set up" as a soldier, and acquire the habit of yielding his attention to the will of his commander. There is nothing humiliating or degrading in this. On the contrary, the highest type of manhood is found in the "good soldier." Military virtues are courage, honor, loyalty, zeal and obedience, qualities which strengthen the people and the Nation.

The moral instruction of the soldier is in the hands of his comrades as well as his superiors, and a healthy "esprit de corps" is essential to discipline. Pride in the uniform, respect and love for the flag, and loyalty to comrades as well as superiors, should be inculcated. There must be sentiment combined with authority, and "pomp and ceremony" are as essential as battle tactics. The strains of martial music, the sound of the cannon in compliment to the flag, and to high officials, and over the graves of dead comrades, inspire those patriotic, fraternal

feelings which beget the highest type of discipline, and the authorities which neglect these will have mutiny to deal with sooner or later.

Military discipline should be exercised with firmness, kindness and justice, and when all other measures fail, prompt punishments must be administered.

COURTESIES.

Courtesy is indispensable to discipline, and respect to superiors is not to be confined to obedience on duty, but extended to all occasions.

All officers salute on meeting and in making or receiving official reports. Military courtesy requires the junior to salute first, but when the salute is introductory to a report made at a military ceremony or formation to the representative of a common superior—as for example, to the adjutant, officer of the day, etc.—the officer making the report, whatever his rank, will salute first; the officer to whom the report is made will acknowledge by saluting, that he has received and understood the report. When under arms the salute is made with the sword or saber if drawn; otherwise with the hand. A mounted officer dismounts before addressing a superior not mounted.

On official occasions, officers when indoors and under arms do not uncover, but salute with the sword if drawn; otherwise with the hand. If not under arms, they uncover and stand at attention, but do not salute except when making or receiving reports.

When an enlisted man without arms passes an officer he salutes with the hand farthest from the officer. If mounted, he salutes with the right hand. Officers are saluted whether in uniform or not.

An enlisted man, armed with the saber and out of ranks, salutes all officers with the saber if drawn; otherwise he salutes with the hand. If on foot and armed with a rifle or carbine, he makes the rifle or carbine salute. A mounted soldier dismounts before addressing an officer not mounted.

A noncommissioned officer or private in command of a detachment without arms salutes all officers with the hand, but if the detachment be on foot and armed

with the rifle or carbine, he makes the rifle or carbine salute, and if armed with a saber he salutes with it.

An enlisted man, if seated, rises on the approach of an officer, faces toward him and salutes. If standing, he faces the officer for the same purpose. If the parties remain in the same place or on the same ground, such compliments need not be repeated. Soldiers actually at work do not cease work to salute an officer unless addressed by him.

An enlisted man makes the prescribed salute with the weapon he is armed with, or if unarmed, whether covered or uncovered, with the hand, before addressing an officer. He also makes the same salute after receiving a reply.

Indoors, an unarmed enlisted man uncovers and stands at attention upon the approach of an officer; he does not salute unless he addresses or is addressed by the officer. If armed, he salutes as heretofore prescribed, without uncovering.

When an officer enters a room where there are soldiers, the word "Attention" is given by some one who perceives him, when all rise and remain standing in the position of a soldier until the officer leaves the room. Soldiers at meals do not rise.

Soldiers at all times and in all situations pay the same compliments to officers of the army, navy and marines, to officers of volunteers and officers of the militia in the service of the United States, as to the officers of their own regiment, corps or arm of service.

Officers will at all times acknowledge courtesies by returning salutes given, in the manner prescribed in drill regulations. When several officers in company are saluted, all who are entitled to the salute return it.

HONORS.

The officers named below will be received with standards and colors dropping, officers and troops saluting, and the bands and field music playing, as follows: The President, the President's march; the general, the general's march; the lieutenant-general or the major-general commanding the army, the trumpets

sounding three flourishes or drums beating three ruffles ; a major-general, two flourishes or two ruffles ; a brigadier-general, one flourish or one ruffle.

To the Vice-President, the members of the cabinet, the chief justice, the president of the senate, the speaker of the house of representatives, American or foreign ambassadors, and governors within their respective states and territories the same honors are paid as to the general ; to the assistant secretary of war and to American or foreign envoys or ministers, the same honors as to the lieutenant-general ; to officers of the navy the honors due to their assimilated or relative rank ; to officers of marines and volunteers and militia when in service of the United States, the honors due to like grades in the regular service ; to officers of a foreign service the honors due to their rank.

The national or regimental color or standard, uncased, passing a guard or other armed body will be saluted, the field music sounding "to the color" or "to the standard." Officers or enlisted men passing the uncased color will render the prescribed salute ; with no arms in hand, the salute will be made by uncovering.

No honors are paid by troops when on the march or in trenches and no salute is rendered when marching in double time or at the trot or gallop.

"The *commanding officer" is saluted by all commissioned officers in command of troops or detachments. Troops under arms will salute as prescribed in drill regulations.

SALUTES WITH CANNON.

Salutes will be fired between sunrise and sunset only, and, as a rule, not on Sunday. The national flag will always be displayed at the time of firing a salute.

The national salute is 21 guns. The salute to the Union, commemorative of the Declaration of Independence and consisting of one gun for each state, is fired at noon on July 4, at every post provided with artillery.

The President, both on his arrival at and departure from a military post, receives a salute of 21 guns. No other personal salute is fired in his presence.

*The term "commanding officer" applies to commanders of brigades, regiments, battalions, companies, troops, batteries, posts, or detachments acting as independent commands.

The Vice-President and President of the senate receive a salute of 19 guns; members of the cabinet, the chief justice, the speaker of the house of representatives, American or foreign ambassadors, a committee of Congress officially visiting a military post, and governors within their respective states or territories, receive 17 guns. The assistant secretary of war, when officially visiting a military post, receives 15 guns.

American and foreign envoys or ministers receive 15 guns; ministers resident accredited to the United States, 13 guns; charges d'affaires, 11 guns; consuls-general accredited to the United States, 9 guns.

The sovereign or chief magistrate of a foreign country receives the salute prescribed for the President; members of a royal family receive the salute due to their sovereign.

The general receives a salute of 17 guns; the lieutenant general or major-general commanding the army, 15 guns; a major-general, 13 guns, and a brigadier-general, 11 guns.

An officer assigned to duty according to his brevet rank is entitled to the salute prescribed for the grade to which he is assigned.

As a rule, a personal salute is fired when the personage entitled to it enters a post.

A general officer is saluted but once a year at each post when notice of his intention to visit it has been given. A retired general officer making an official visit is saluted according to his grade. When several persons, each of whom is entitled to a salute, arrive together at a post, the highest in rank or position is alone saluted. If they arrive successively, each is saluted in turn.

Officers of the Navy are saluted according to their relative rank; officers of marines and of volunteer forces or militia in the service of the United States and officers of foreign services are saluted according to rank.

The salute to a national flag is 21 guns.

It is the custom of foreign ships of war, on entering a harbor or passing near a fortification to hoist at the fore the flag of the country in whose waters they are and to salute it. On the completion of the salute to the flag, a salute of the same

number of guns will be promptly returned by the nearest fort or battery. If there be several forts or batteries in sight, or within 6 miles of each other, the one designated "saluting station" will return the salute. United States vessels return salutes to the flag in United States waters only when there is no fort or battery to do so. United States vessels do not salute United States forts or posts.

When a civil functionary, entitled to a salute, arrives at a military post the commanding officer meets or calls upon him as soon as practicable, and will tender him a review, if the garrison consists of not less than four companies. When a general officer visits a post within his command, the troops will be paraded for review, unless he directs otherwise. When a salute is to be given an officer junior to another present at a post, the senior will be notified to that effect by the commanding officer.

The flag of a military post will not be dipped by way of salute or compliment.

VISITS AND COMPLIMENTS.

Officers arriving at the headquarters of a territorial department, military command, or at a military post, will call upon the commander thereof as soon as practicable and register their names. If the visiting officer be senior to the commander, the former may send a card, in which case it becomes the duty of the commander to make the first call.

The interchange of official compliments and visits between foreign military and naval officers and the authorities of a military post is international in character and opens the way to official and social courtesies among the officers. In cases of vessels of war, foreign or otherwise, recently arrived, it is the duty of the post commander to send a suitable officer to offer civilities and assistance. It is expected that this civility will be returned and that within twenty-four hours thereafter, weather permitting, the officer in chief command of the ship or ships will visit the officer in command of the post or station, should the latter be his equal or superior in grade. This visit will be returned within twenty-four hours. Should the naval officer in command be superior in grade to the officer commanding the post or station the first visit will be paid by the latter.

When a military commander officially visits a vessel of war, he will give notice in advance of his intention to do so. He is received at the gang-way by the commander of the vessel and is accompanied there by the same officer when leaving. The officer who is sent with the customary offer of civilities is met at the gang-way of a vessel of war by the officer of the deck, and is presented by the latter to the commander of the vessel.

A vessel of war is approached and boarded by commissioned officers, by the starboard side and gang-way. In entering a boat the junior goes first and other officers follow in order of rank; in leaving a boat the senior goes first. The latter acknowledges the salutes which are given at the gang-way of a naval vessel.

Naval vessels fire personal salutes to officers entitled to them when the boats containing them have cleared the ship. It is an acknowledgment of the salute by the officer saluted for his boat to lie on her oars from the first until the last gun and for him to uncover, at the conclusion, to give way. Personal salutes are not returned by military posts.

In case of vessels of war of foreign powers at peace with the United States, lying in our ports or harbors and celebrating their national festivities, the commander of each fort, battery, or military post may participate in the celebration by firing salutes, parading commands, etc. In such a case the flag of the United States will be hoisted and lowered simultaneously with that of the ship on board of which the celebration occurs.

FUNERAL HONORS.

When the funeral of an officer, who was entitled to a salute, takes place at or near a military post, minute guns will be fired while the remains are being borne to the place of interment, but the number of guns will not exceed that to which the officer was entitled as a salute. After the remains are deposited in the grave a salute corresponding to the rank of the deceased will be fired, in addition to three salvos of artillery or three volleys of musketry.

On the death of an officer at a military post the flag is displayed at half-staff and so remains, between reveille and retreat, until the last salvo or volley is

fired over the grave ; or if the remains are not interred at the post, until they are removed therefrom.

During the funeral of an enlisted man at a military post the flag is displayed at half-staff. It is hoisted to the top after the last volley or gun is fired, or after the remains are taken from the post. The same honors are paid on the occasion of a retired enlisted man.

When the flag is displayed at half-staff it is lowered to that position from the top of the staff. It is afterwards hoisted to the top before it is finally lowered.

Six pallbearers will be selected from the grade of the deceased or from the next grade above or below.

The badge of military mourning is a knot of black crape worn upon the sword hilt for a period not to exceed thirty days.

The drums of a funeral escort will be covered with black crape or thin black serge.

The colors of a regiment will not be placed in mourning or draped, except when ordered from the War Department. Two streamers of crape seven feet long and about twelve inches wide attached to the ferrule below the spearhead will be used.

DAILY SERVICE.

At all garrisoned military posts there will be daily one parade, morning or evening, as the commanding officer may direct, which will not be dispensed with except on urgent occasions. All officers and men will be present unless specially excused or on duty incompatible with such attendance.

At every military post or station the flag will be hoisted at the sounding of the first note of reveille, or of the first note of the march, if a march be played before the reveille. The flag will be lowered at the sounding of the last note of the retreat, and while the flag is being lowered the band will play The Star Spangled Banner.

In camp and garrison there should be daily at least two roll calls, viz, at reveille and retreat. Commanding officers may also order roll calls in special cases at such times as they deem necessary. The roll will be called on the company parade by the first sergeant, superintended by a commissioned officer.

At retreat roll call the troops are brought to parade rest and so remain during the sounding of retreat.

Except at the ceremony of parade, the result of a roll call will be reported after the companies have been dismissed, to the officer superintending the call, (habitually the adjutant) who will report the result to the commanding officer.

In camp and garrison the commanding officer fixes the hours for reports, issues and roll calls, and for the performance of stated duties and fatigues. In garrison, retreat will be at sunset.

ARREST AND CONFINEMENT.

For the more serious offences against military discipline, officers and non-commissioned officers are placed in arrest, and other soldiers are confined under guard to await trial by a court-martial, as provided for in the *Articles of War.

"Commanding officers" only have power to place officers in arrest, except as provided in the 24th Article of War. An arrest may be ordered by the commanding officer, in person or through his staff officer, orally or in writing.

All officers have power to place enlisted men in arrest or confinement. Except as provided in the 24th Article of War or when restraint is necessary, no soldier will be confined without the order of an officer who shall previously inquire into his offense.

Non-commissioned officers will not be confined at the guardhouse in company with privates, except in aggravated cases or where escape is feared, but will be placed in arrest in their barracks or quarters.

An officer arrested will repair at once to his tent or quarters, and there remain until more extended limits have been granted by the commanding officer,

*The Articles of War will be found in U. S. Army Regulations.

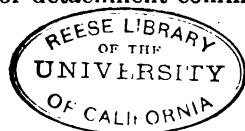
on written application. Close confinement will not be enforced except in cases of a serious nature.

Officers will not be placed in arrest for light offenses. For these the censure of the commanding officer will generally answer the purpose of discipline.

An officer in arrest will not wear a sword or visit officially his commanding or other superior officer, unless directed to do so. His applications and requests of every nature will be made in writing.

On the march, field officers and noncommissioned staff officers in arrest will follow in the rear of their respective regiments, and company officers and non-commissioned officers in arrest, in rear of their respective companies, unless otherwise specially directed.

The arrest of a noncommissioned officer or the confinement of a soldier will as soon as practicable, be reported to his company or detachment commander by the officer authorizing the arrest.



RIFLE FIRING.

The following notes are intended for use in connection with the U. S. Infantry drill regulations, to assist in the effective use of the rifle. The Springfield breech-loading rifle, calibre .45 is the one considered to be in use, although the general principles assumed may apply to the use of any rifle, due allowance being made for the difference in mechanism.

THE SPRINGFIELD BREECH-LOADING RIFLE.

This is the firearm which has been used by our infantry since the War of Secession up to the time of issuing the magazine rifle in 1896. It took its name from Springfield Armory, in Massachusetts, which has been the small arm manufactory of the United States for many years. Although the magazine rifle has recently been issued to our regular army, the Springfield rifle is still the weapon in the hands of most of the "militia" of the country and the students at our military colleges, and will be in use for many years to come, and many are still reluctant to concede its inferiority to the magazine gun. There are two sizes



Fig. 37.

known as the "infantry rifle" and the "cadet rifle," the latter being like the former except that it is some three inches shorter, and weighs about one pound less. It was made for the cadets at West Point and is issued to military colleges and schools.

Figure 37 shows the Springfield rifle with bayonet attached.

The rifling consists of three plain concentric grooves, equal in width to the lands, and .005 inches deep, with a uniform twist to the right of one turn in 22 inches. The chamber is made slightly conical so as to facilitate the withdrawal of the cartridge case.

The weight of the "infantry rifle" without bayonet or sling is 9.30 pounds, and the weight of the "cadet rifle," without bayonet or sling is 8.49 pounds. The caliber was originally .58 inches but has been reduced to .45 inches.

The triggers are adjusted to pull off at six to eight pounds.

Figure 38 (page 143) represents a section of the breech mechanism by a vertical plain through the axis of the receiver, with the several parts projected thereon, showing their relative positions.

A, bottom of receiver; B, *barrel*, with its screw thread; C, *breech-screw*, with its circular recess to receive the cam-latch; E, *hinge pin* around which the *breech-lock* D turns; F, *cam-latch*, which locks the breech-block in place; G, *cam-latch spring*, to press the cam-latch into the recess; H, *firing pin*, which transmits the blow of the hammer to the priming of the cartridge; J, *extractor*, to withdraw the empty cartridge shell after firing; K, *ejector spring and spindle*.

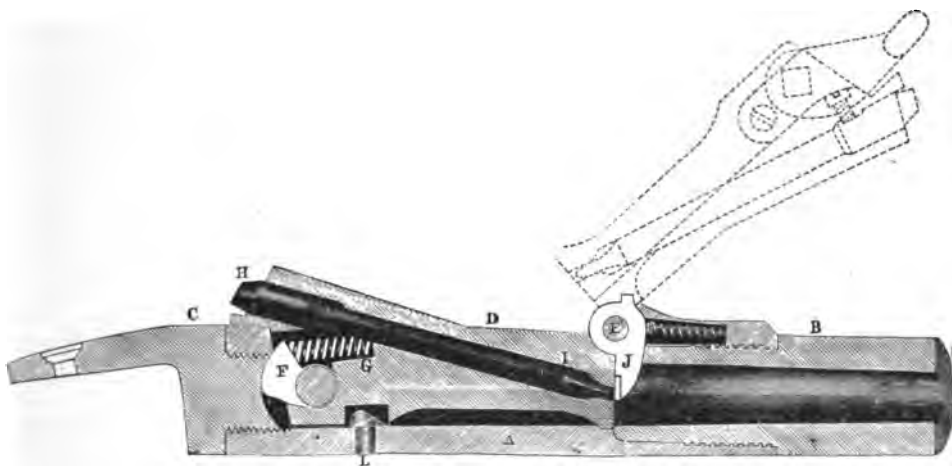


Fig. 38.

The *ejector stud* L serves to deflect the shell upward, causing it to clear the *well* of the reservoir.

REAR SIGHT.

The present rear sight on the Springfield rifle is adjustable both for elevation and to enable the marksman to correct his aim for wind.

The slide, moving upward to the left, secures automatic adjustment at each elevation for drift.

The leaf *down* is for "point blank" 100 yards; *up* for 200 to 2,000 yards, inclusive, with both open and aperture sights.

The adjustment of other "rear sights" must be learned in accordance with their mechanism, previous to attempting rifle practice.

CARTRIDGE FOR THE SPRINGFIELD RIFLE.

Figure 39 illustrates the solid-head reloading cartridge, calibre .45. It consists of a copper case containing 70 grains of black musket powder, an exterior primer containing one-half grain of percussion composition, and a lubricated lead bullet weighing 500 grains.

Three rectangular cannelures contain the lubricant which consists of bayberry tallow.

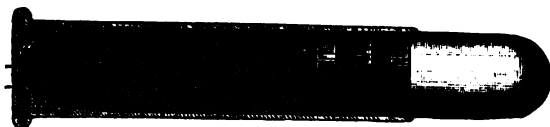


Fig. 39.

The cartridge is rendered waterproof by the lubricant and the case being tightly crimped around the bullet.

DIRECTIONS FOR USING THE SPRINGFIELD BREECH-LOADING SYSTEM.

Should the extractor cut through the rim of the shell and thereby fail to withdraw it, draw the ramrod and drive the shell out.

The chamber should be kept clean, and great care should be observed to prevent cartridges fouled with dirt, and particularly sand, from being inserted or discharged in the piece.

The shell of an exploded cartridge should not be allowed to remain in the chamber any length of time for fear it may adhere by corrosion.

Headless shells are removed with a small instrument which the soldier carries in his pocket known as the "headless shell extractor."

TO CLEAN THE BARREL.

A wet flannel rag should be first passed through the bore; this should be only sufficiently moistened to soften and remove the greater portion of the residuum of the powder; if any excess of water is employed, the difficulty of wiping the piece dry is enhanced and the possibility of rusting the extractor or the head of the breech-screw is much increased. Hot water should not be used, as cold or tepid water will dissolve the residuum much better. Several oiled flannel or strong cotton rags should next be used; these should fit the bore closely and be run up and down several times to remove any lead. After the bore is clean it should be wiped with a dry rag to remove any excess of oil. Cos-

moline oil is the best for this purpose. Sperm and sewing-machine oils are also good. Olive oil often gums and should not be used. A wooden cleaning rod should always be employed, as the iron ramrod may scratch the bore, and injure the rifling.

When practice is concluded the piece should be at once cleaned before the fouling has had time to harden.

TO CLEAN THE LOCK.

Wipe every part with a moist rag and then a dry one; if any part of the interior shows rust put a drop of oil on the point or end of a piece of soft wood dipped into *flour* of emery; rub out the rust, clean and wipe the surface dry, then rub every part with a slightly oiled rag.

TO CLEAN THE MOUNTINGS.

Remove dirt from the screw-holes by screwing a piece of soft wood into them.

Wipe clean with a linen rag and leave the parts slightly oiled. In cleaning the arms great care should be observed to preserve the qualities essential to service rather than to obtain a bright polish.

Burnishing the barrel (or other parts) should be strictly avoided, as it tends to crook the barrel and also to destroy the uniformity of the exterior finish of the arm.

Browned arms are cleaned by rubbing them hard with an oiled rag until the oil is well incorporated with the browning.

When the ramrod is used for any purpose, care should be taken not to injure the rifling; it should never be "sprung" in the bore, as in the old muzzle-loading smooth-bore arms.

In ordering arms, let the butt be brought gently to the ground, especially when the exercises take place on pavements or hard roads. This will save the mechanism of the lock from shocks which are very injurious to it, and which tend to loosen and mar the screws and split the woodwork.

No cutting, marking, or scraping in any way the wood or iron should be allowed, and no part of the gun should be touched with a file. Take every possible care to prevent water from getting in between the lock or barrel and stock. If any should get there, dismount the gun as soon as possible, clean and oil the parts and see that they are perfectly dry before reassembling them.

DRIFT.

It has been found that in firing a rifle with right hand twist rifling, as in the service rifle, the projectile has a tendency to deviate to the right of the plane of fire. This is reversed in firing with an arm rifled with left-hand twist rifling. This deviation is called the drift.

The "drift" for the Springfield rifle, cal. .45 is to the right; three inches at 200 yards, five inches at 300 yards, $11\frac{1}{2}$ inches at 500 yards and 43 inches at 1000 yards.

VELOCITY.

The muzzle velocity of the rifle bullet fired from a Springfield rifle, cal. .45, is 1,315.7 feet per second.

MAXIMUM RANGE.

With the service ammunition, i. e., 70 grains, and a 500 grain bullet, the maximum range of the Springfield rifle, cal. .45, is 3,500 yards, the angle of elevation being $29^{\circ} 45' 36''$, the penetration 10 inches in sand; time of flight, 21.2 seconds.

DEFINITIONS.

The line of fire is the axis of the bore prolonged.

The plane of fire is a vertical plane through the line of fire.

The line of sight is the right line from the eye to the object to be hit, passing through the front and rear sights.

The *natural line of sight* is the right line through the lowest notch of the rear sight and the front sight.

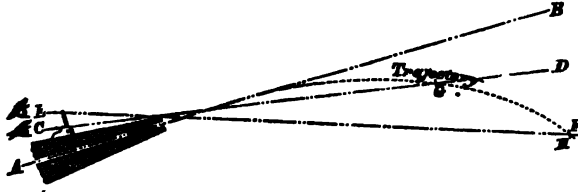


Fig. 40.

In figure 40, the line A B, illustrates "the line of fire"; C D, the natural line of sight; E F, the artificial "line of sight," G, the "point-blank," and H, the artificial point-blank.

To aim the piece correctly, the eye, the notch in the rear sight, the front sight, and the object, must be in the same right line, lying in the plane of fire. The rear sight must be vertical or there will be a deviation in the direction towards which the sight is tipped. ¶

An object is at *point-blank* distance when it can be hit by aiming directly at it along the natural line of sight.

The distance, with the present arm, is one hundred yards.

To hit an object within the *point blank*, the piece is aimed below it.

To hit an object beyond the *point blank*, the muzzle has to be raised, which is effected by elevating the notch on the rear sight along a vertical leaf, on which are graduated distances; by this means artificial *point blanks* are established, the piece being aimed as when at *point blank*.

TRAJECTORY.

The curve which the bullet describes, after leaving the rifle, is called the "trajectory."

A bullet discharged from the rifle is acted upon by several forces—the three principal forces being the projectile force, acting to propel it in a straight line (the line of fire); the force of gravity, which tends it toward the centre of the earth; the resistance of the air, acting to retard the bullet.

The combined effects of these three forces causes the bullet to assume a curve in its flight, called the "trajectory," as illustrated in Figure 41.

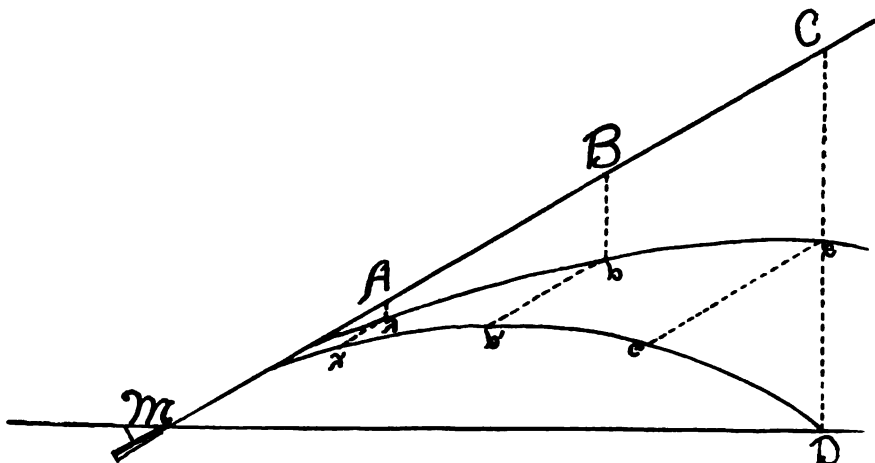


Fig. 41.

M C being the line of fire, and M D the line of sight, suppose that the bullet leaves the muzzle of the rifle at M with such a velocity that, considering only the projectile force, it will be at A at the end of one second, at B at the end of two seconds and at C at the end of three seconds.

The action of the force of gravity upon bodies in motion is the same as when at rest, and consequently under the combined action of the projectile force and the force of gravity the bullet would be at the points a, b, c, at the end of one, two and three seconds, respectively. But, retarded by the atmosphere in connection with the other two forces, the bullet would be at a', b', c'.

Connecting the points a', b', c', and D, the trajectory is constructed.

In connection with the three principal forces given above, the effect of the wind, and "drift" must be considered, also the condition of the atmosphere as regards temperature and humidity, the kind of ammunition, the varying light, etc.

DANGEROUS SPACE.

As the trajectory at long ranges rises to a considerable height, e. g., 43 feet, when firing with the Springfield rifle at 1000 yards—there is only a certain dis-

tance near the muzzle of the rifle and near the object aimed at, in which a man standing would be hit by a bullet in its flight. This is called "dangerous space."

It is about all dangerous space at the 200 yard range when firing the Springfield rifle, but at the 1000 yard range, the dangerous space for infantry, in the rising branch of the trajectory, is only five yards, and in the falling branch only thirteen yards in front of the target.

AIMING POSITIONS.

The standing, kneeling and lying positions are illustrated in the U. S. Drill Regulations. The standing position is taken for distances up to include 200 yards; the kneeling position, for distances between 200 and 500 yards, and the lying position for 500 yards and all greater distances.

SIGHTING.

In rifle shooting, most men find it easier to sight with the right eye alone than with both eyes open. The latter, however, is a far better mode of shooting at movable objects and at short ranges, and the art is not difficult to acquire after some few trials.

The chief requisite is to bend the neck, holding the head well over, and pressing the cheek firmly against the stock, so that the muzzle sight shall be exactly opposite the center of the forehead.

In using military sights, the safest way is to draw a "full sight." The difficulty of being certain that the same amount of the fore-sight is drawn every time is much greater when a "fine" or "half-sight" is drawn; and there is also more blur with the two latter. For this reason, the best shots bring up the front sight until they can just see the edge of the block at the bottom of the notch of the rear sight, thus exposing the entire front sight. In target firing, some aim directly at the bull's-eye. It is a better plan to aim either at the lower corner or one side, so as to give a full view of the bull's-eye. If the aim is taken directly on the bull's-eye, the front sight covers it so as to render the aim uncertain.



Fig. 42.



Fig. 43.



Fig. 44.

Figure 42 illustrates the full-sight. Figure 43 illustrates the fine-sight. Figure 44 illustrates the half-sight.

The effect of the full-sight is to cause a higher point to be struck than if either of the other kinds of sight are taken. The fine-sight will cause a lower point to be struck.

PULLING THE TRIGGER.

The trigger is pulled by a steadily increasing pressure of the finger in the direction of the axis of the piece, the breath always being held from the commencement of the pressure till the hammer strikes.

If the trigger be pulled by a convulsive motion, the muzzle will be moved to the right.

After learning to pull the trigger without deranging the aim, the men are taught to support the recoil by pressing the butt firmly against the shoulder with the right hand; the left hand supports the weight of the piece, and steadies it in aiming.

The men are next given blank cartridges to accustom them to the noise of the piece, and further confirm them in the principles of aiming and firing.

VOLLEY FIRING.

After men have been instructed as individuals, experience shows that if the commands are properly given men will shoot as well and sometimes better by volley, than when firing singly.

All authorities concede that, in future, infantry fire will be employed by volley, and at the extreme ranges.

If the officer, in giving the commands, after the word aim, will count in a distinct voice, one, two, three, with a second's interval before the command fire,

the men will be greatly aided in taking sight, by knowing just how much time they have.

GALLERY PRACTICE.

Men, by squads or sections, may with profit, be instructed in the principles of aiming and sighting, indoors, previous to range-firing. To this end, a target is made, having a black circle about two inches in diameter for the center, and exterior to it, two concentric black rings.

The target may be tacked to the side of the room and a table or tripod on which rests a sand-bag placed at a short distance from the target. The upper surface of the sand-bag should be at the height of the shoulder.

The instructor indents the sand-bag slightly, and places the rifle on it, aiming it accurately at the "bull's-eye." He then requires the men separately to examine the aim, causing them to close the left eye. He next deranges the piece and causes the men successively to direct it on the bull's-eye, verifying each aim and deranging it before the next man steps forward. The instructor next aims the piece above, below, to the right or left of the bull's-eye, and requires the men to state the error and to correct it. These lessons are repeated at different distances, the instructor exposing faults and requiring the men to correct them.

RANGE FIRING.

After men have been taught the aiming positions and the use of the sights they should be taken upon an out-door range, fitted up with targets for the various ranges and "butts" behind which markers can safely stand to indicate the "hits," so that they can be scored at the firing points. Individual practice should at first be conducted at known distances, only two men being placed at the firing point at the same time, to fire alternately under the direction of a competent coach. Practice should commence at 100 yards, and as soon as men are able to score 60% they should be moved back to 200 yards, and after they are able to score 60 % at 200 yards they should be moved back to the 300, 500, 600, 800 and 1000 yard ranges in succession.

KNOWN DISTANCE TARGETS.

Figure 45 illustrates the "short range" target used for 100, 200 and 300 yards.

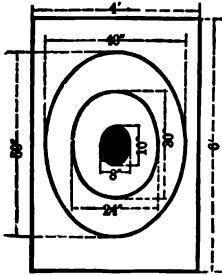


Fig. 45.

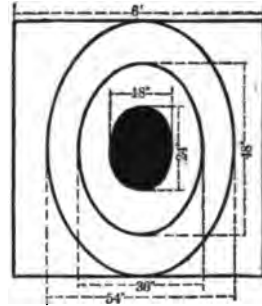


Fig. 46.

The shape of the bull's eye and concentric rings is elliptical with transverse axis, vertical. The dimensions are given on the target.

Figure 46 shows the dimensions for the "mid-range" target used for 400, 500 and 600 yards.

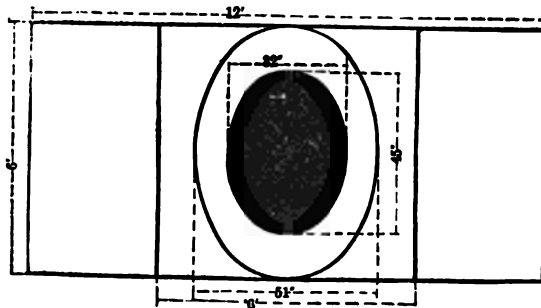


Fig. 47.

Figure 47 shows the dimensions of the "long-range" target used for all distances above 600 yards up to 1400 yards.

MARKING AND SCORING.

A "bull's-eye" counts five, and is marked at the target by a white disc. A hit within the first ellipse next the bull's-eye counts four and is marked by a red

disc. A hit within the outer ellipse (or square on the long range target) counts three, and is marked by a black and white disc. A hit on the target outside of the outer ellipse or square counts two and is marked with a black disc. A miss counts zero, and is marked by waving a red flag several times across the front of the target.

SKIRMISH FIRING.

When the soldier has become fairly proficient in individual firing at known distances he should be practiced in firing as a skirmisher at figure targets at varying distances.

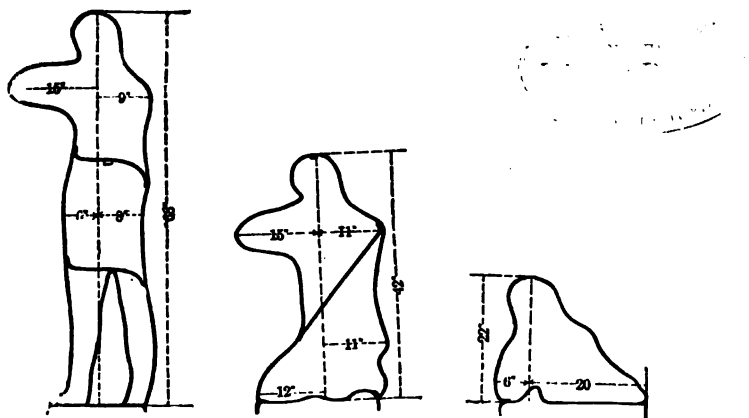


Fig. 48.

Figure 48 shows the three skirmish targets in use, viz: the standing target, the kneeling target and the lying target. The skirmish targets are iron skeleton frames, representing the outline of a soldier in the firing positions standing, kneeling and lying, and are retained in a vertical position by points at the bottom of the frame and by a sustaining rod, slanting to the rear, back of the target. When used as targets they are covered with cloth and over this with black paper.

A hit on the standing target counts three, on the kneeling target four and on the lying target five.

The practice should be by squads, the square being deployed as skirmishers with intervals of five yards, at about 600 yards from the targets.

The skirmish targets should be arranged in groups, each group consisting of one standing, one kneeling and one lying target with the kneeling target in the middle, the distance between groups being five yards, measuring from the center of one group to the center of the next group, the targets in the same group being near together but not touching.

Numbers should be placed over each group, and each skirmisher assigned a group by its number, the number of groups thereby corresponding to the number of skirmishers.

The instructor should be accompanied by a trumpeter and carry a stop watch. The commands should be sounded by the trumpeter.

At the command "*Forward, MARCH,*" the line will advance, first at quick and then, at the proper commands, at the double time until the signal "*Skirmishers, HALT,*" which will be immediately followed by the signal "*Commence FIRING,*" when the sights will be adjusted to the estimated distance, the rifle loaded, and the position for firing assumed. After the last note of the signal "*Commence, FIRING,*" the firing will be opened. The firing will cease at the *last note* of the signal "*Cease, FIRING,*" which note will be sounded exactly thirty seconds after the last note of the signal "*Commence, FIRING.*"

As soon as the firing is completed the line will advance without delay in the same manner as before the first halt, at quick and then at double time, until the succeeding halt is ordered.

Having approached in this manner a point a little more than 200 yards from the targets, the signal, "*To the rear, MARCH,*" will be given, when the manœuvring to the rear and the firing will be conducted as upon the advance. The rifles will be pointed in the general direction of the targets when manœuvring to the rear.

Five halts will be made in advancing and five in retiring; they will be at approximately regular intervals, dividing uniformly the ground manœuvred over.



Fig. 49.

At least one shot will be fired at each halt, and twenty or forty shots may be fired at the ten halts by each skirmisher, as decided by the instructor previous to the start.

The hits will be counted after the squad has completed the "run" (from the 600 yard point down to the 200 yard point and return).

Five points will be deducted from each skirmisher's score for each failure to fire one shot at each halt and for each shot fired in excess of the number designated by the instructor, and for each shot fired before the last note of the signal *Commence Firing* or after the last note of the signal *Cease Firing*.

RECORD AND CLASSIFICATION.

Record should be kept of every shot fired at a target; individual records at known distances being by scores of 10 shots each. Individual skirmish firing should also be recorded and such a classification adopted as will best stimulate proficiency, the object of instruction being to develop in a body of troops such a state of discipline, such a knowledge of the capabilities of their weapon and such accuracy in its use as will render their fire effective in battle.

THE UNITED STATES MAGAZINE RIFLE.

The United States Government has recently adopted and issued to the regular army a magazine rifle, calibre .30. Figure 49 gives a side view of the rifle with the knife bayonet attached. The knife bayonet, when detached, can be used to dig up earth for hasty intrenchments and as a hunting knife. Figure 50 illustrates the cartridge.



Fig. 50.

The bullet is a nickeled steel case, filled with lead, weighing 220 grains. About 30 grains of smokeless powder are used, giving a velocity of 2,000 feet per second, and a trajectory so flat that at 600 yards it does not rise above the height of a man.

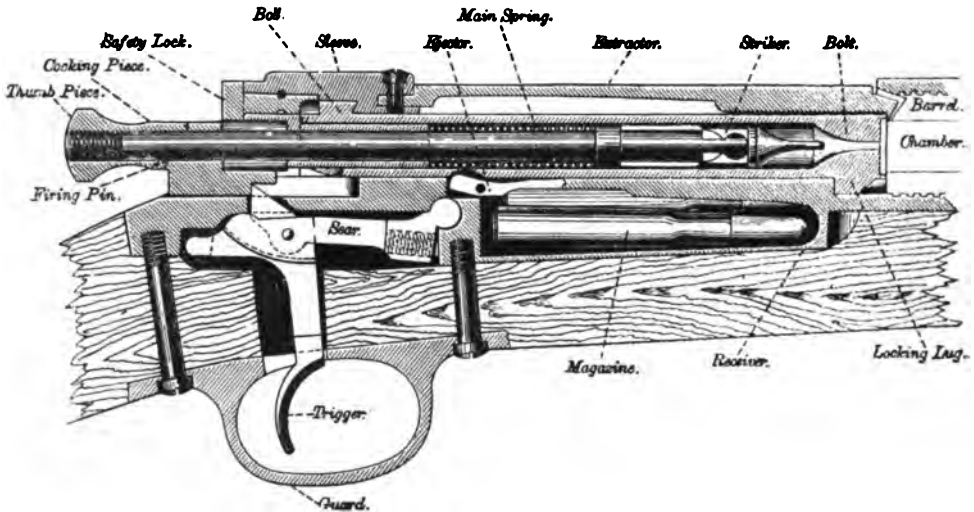


Fig. 51.

Figure 51 shows the breech mechanism. This is a "bolt" gun and belongs to that class of magazine arms in which the magazine is located centrally, at the rear of the barrel. It is horizontal under the "receiver." Figure 52 represents a cross section of the receiver and magazine, the latter, fully charged, but cut off.

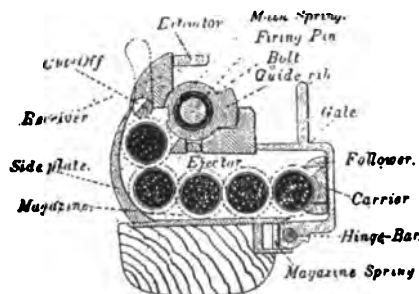


Fig. 52.

The weapon can be used, *first*, as a magazine arm, the cartridges for each fire being fed only from the magazine, which is recharged when entirely or when

partly emptied; *second*, as a single loader, with magazine ignored and not charged; *third*, as a single loader, with magazine charged but held in reserve by the cut off. The magazine, having been emptied, can be filled, or, if one or more cartridges have been fired from it, can be replenished by first opening the gate.

The rifling is by four grooves, with a uniform twist to the right of one turn in 10 inches. The depth of the grooves is .004 inches. The trigger pull is $4\frac{1}{2}$ to 6 pounds. The total weight of the arm without bayonet is 9.355 pounds.

CLEANING AND CARE OF THE ARM.

As the residuum of smokeless powder, if not completely removed, corrodes the bore in a short time, care is required in cleaning the arm after the firing.

To clean the barrel, remove the bolt and wipe out the chamber and receiver with dry rag, removing any unburned powder, then clean the bore and chamber with a rag saturated with soda water, and wipe thoroughly dry with a clean rag; finally, oil bore and chamber with cosmoline oil, leaving a light coating.

The cleaning and care of the arm is otherwise the same as for the Springfield rifle.

THE CARBINE.

The cavalry arm, called a "carbine" only differs from the infantry rifle in the length of the barrel and stock, in having no bayonet and in having a swivel-bar and ring on the left side of the stock opposite the lock for attaching the carbine sling, which the soldier wears over his left shouldier when mounted.

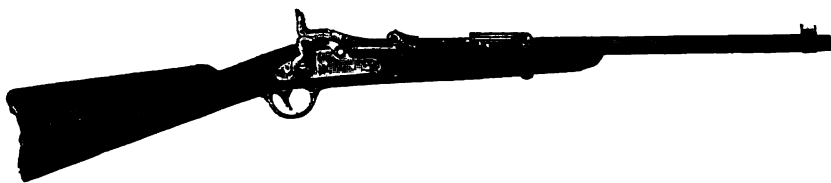


Fig. 53.

Figure 53 shows the Springfield carbine. The length of the barrel and also the length of the arm complete is ten inches less than that of the infantry rifle.

Our cavalry are now armed with the magazine carbine of the same model as the infantry magazine rifle.

THE PISTOL.

The cavalry and artillery are armed with pistols which are also issued to non-commissioned officers of infantry for field service.



Fig. 54.

Figure 54 shows the side elevation of the Colt's army pistol, calibre 38. It is rifled with a left-hand twist and has six chambers.

Officers wear the pistol for field service.

Troops armed with the pistol should be instructed in its use, and the practice for mounted troops should be conducted mounted. The pistol is carried in a holster attached to the belt on the right side, so as to leave the stock of the pistol to the front.

The best results in firing with the pistol are obtained by following the method of snap shooting. For this practice, take the position of "Raise, PISTOL" by grasping the stock in the holster with the right hand, the back of the hand to the body, draw it from the holster, reverse it, muzzle up, the hand holding the stock with the thumb and last three fingers; forefinger out side of the guard, guard to the front, barrel vertical, hand as high as the neck and six inches to the right and front of the right shoulder. Cock the piece with the right thumb, carry the forefinger lightly against the trigger and direct the eyes towards the objective. Thrust the point of the pistol towards the

objective, arm nearly or quite extended, keeping the eyes on the subject and pulling the trigger when the pistol comes to a stop.

An almost imperceptible pause may be allowed between the thrusting and firing, in which to correctly point the pistol. After firing a shot resume the position of "raise," cock the piece and continue the firing until the six chambers are exhausted.

For double action pistols, the firing is executed the same, except that the pistol is recocked by pressing steadily on the trigger. These motions should be repeated several times without cartridges, after which blank cartridges should be used for a few rounds, before loading with ball cartridges.

For scoring, dismounted, the same target may be used as for firing with the rifle at 200 yards. The practice should first be at 10 yards and afterwards at 25 yards, 50 yards and 75 yards.

For mounted practice six standing skirmish targets may be used, arranged in line 20 yards apart, the firer riding along the line of targets and delivering fire at each target in succession, first moving at a walk and afterwards at a trot and at a gallop, on a track five yards from the line of targets.

For front fire, each firer uses but one target, moving towards the target from a point about 100 yards distant and discharging six shots in succession as he approaches the target, care being taken to turn the horse sufficiently to the right or left at each discharge to avoid firing too near the horse's ear.

FIRE DISCIPLINE.

Napoleon said, "Fire is everything, the rest is of small account."

While we must not interpret this maxim to the depreciation of any part of the art of war, the most important phase of military instruction is embodied in the term "fire discipline," as it involves the one purpose for which the government has soldiers; all other steps in military preparations being but auxiliary to this.

It cannot be expected that students in college will be able to devote sufficient time to target practice to become expert marksmen, but they should have access

to a range and be practiced firing there, during their theoretical course, at each of the ranges from 100 back at least to 500 yards so as to see the practical effect of fire-arms and appreciate that their weapons are something besides school-boy toys. The various operations pertaining to known distance, skirmish and volley firing upon the range give the practical side to the education, without which the theoretical makes but little impression, and any institution that attempts military instruction should provide a target ground for its military department as much as work shops and laboratories for its agriculture, industrial arts, engineering and chemistry.

With these facilities, and not without, fire discipline can be comprehended and worked out in such a way as to furnish object lessons to be carried in memory for use when men may be hastily summoned to defend the flag in future years. The drill regulations give the general rules for "fire discipline" and for manœuvering for defense and attack, and by the use of blank cartridges character can be given to battle exercises.

The subject will be treated more in detail in Lecture No. 10 under the heading "Tactics."

CHAPTER V.



Moving and Supplying Armies.

This subject will embrace the rules governing military occupation ; contributions and requisitions ; safe-guards ; prisoners of war ; marches ; reconnaissance, scouting and contact with the enemy ; convoys and their escorts ; the operations during and after battles ; the location of hospitals and depots ; the procurement of munitions of war and the means of transportation necessary to the movements of troops and their supplies.

MILITARY OCCUPATION, CONTRIBUTIONS AND REQUISITIONS.

Military jurisdiction in the enemy's country, under the laws and usages of war, extends to property and persons within the territory occupied or controlled by the Army. It is exercised by commanding generals, under the instructions of the War Department, is based upon military necessity, and applies to those measures which are indispensable for securing the objects and ends of the war, and for the protection of life and property of non-combatants.

Military necessity admits of all direct destruction of armed enemies, and other persons whose destruction is incidentally unavoidable in armed contests. It admits the capture of every armed enemy, and of every enemy of importance to the hostile government or of danger to the captor. It allows the destruction of property ; the obstruction of the ways and channels of traffic, travel or communication ; the withholding of subsistence or means of life from the enemy, and the appropriation of whatever an enemy's country affords, necessary for the subsistence and safety of the Army.

Military authority may suspend the execution of the laws of the hostile and occupied country. It may suspend or change the relations which arise from the

services due, according to the existing laws of the invaded country, from one citizen or subject of the same to another. It may collect and appropriate public revenue and taxes, and confiscate public property. Unarmed citizens are to be spared and protected in their persons and property, in so far as the exigencies of war will admit, and will be as little disturbed in their private relations as possible.

When the needs of the army absolutely require it, and in other cases, under special instructions from the War Department, the general commanding the Army may make requisitions, in money or kind, on the enemy's country occupied by the troops. No other officer can levy contributions or make requisitions, except under special authority from the War Department.

All property, public or private, lawfully taken from the enemy, or from the inhabitants of an enemy's country, by the forces of the United States, instantly becomes the public property of the United States, and must be accounted for as such. Property captured, or taken by way of requisition, belongs to the United States, and can not, under any circumstances, be appropriated to individual benefit.

Officers will be held strictly responsible that all property taken from alleged enemies by them, or with their authority, is inventoried and duly accounted for. If the property taken can be claimed as private, receipts must be given to the claimants or their agents, and it must be accounted for in the same manner as public property.

When a foraging party is sent out for provisions or other stores, the commanding officer will be held accountable for the conduct of his command, and that a true report is made of all property taken.

No officer or soldier shall, without authority, leave his colors or ranks to pillage, or enter a private house for that purpose. All such acts are punishable with death, and any officer who shall permit them will be held equally guilty with the actual pillager.

It is forbidden to purchase horses without ascertaining the right of the party to sell. Stolen horses shall be restored. Estrays in the enemy's country, when the owners are not discovered, will be taken for the Army.

Neither officers nor soldiers are allowed to make use of their positions or power in the enemy's country for private gain, even for commercial transactions otherwise legitimate. Offenses to the contrary, committed by commissioned officers, will be punished with cashiering, or such other punishments as the nature of the offense may require; if by soldiers, they shall be punished according to the nature of the offense.

All wanton violence committed against persons in the invaded country may be punished with the death of the offender, or such other punishment may be inflicted as may be deemed adequate to the gravity of the offense. Any officer or enlisted man committing such violence, and disobeying a superior ordering him to abstain therefrom, may be lawfully killed on the spot by such superior.

SAFEGUARDS.

Safeguards are written protections granted to persons or property, by the Commanding General of an Army in the field. They are usually given to protect hospitals, museums, post-offices, and other institutions of public benefit; also to individuals whom it may be to the interest of the Army to respect.

A safeguard will be conspicuously posted upon the property which it is intended to protect. If the Commanding General deem it necessary, a suitable escort or guard may be furnished to enforce respect to its terms.

The 57th Article of War prescribes that "Whosoever, belonging to the armies of the United States in foreign parts, or at any place within the United States or their Territories during rebellion against the supreme authority of the United States, forces a safeguard, shall suffer death."

PRISONERS OF WAR.

Prisoners of war will be disarmed and sent to the rear; and reported as soon as practicable to the general headquarters.

Generals commanding departments or armies in the field may, at their discretion, send prisoners of war to the general depots.

Whoever intentionally kills or wounds an enemy already disabled, or who orders or encourages others to do so, shall suffer death.

Every prisoner of war will be treated with the consideration due his rank. He is required to obey the necessary orders given him, and upon being duly interrogated, is required to disclose his name, rank and designation in the military service. Wounded prisoners are to be treated with the same care as the wounded of the army. Every prisoner of war is entitled to one ration per day, regardless of rank; other allowances to them will depend on conventions with the enemy. Prisoners' horses, arms, and other public property will be taken up and accounted for, as captured property.

Money and other valuables on the person of a prisoner, such as watches and jewelry, as well as extra clothing, are regarded as private property. The appropriation of such property is considered dishonorable, and is prohibited.

A prisoner of war, being a public enemy, is the prisoner of the Government and not of the captor. No ransom can be paid by a prisoner of war to his individual captor or to any officer in command. The Government alone releases captives, according to rules prescribed by itself.

Prisoners of war are subjected to such confinement or restraint as may be deemed necessary, but they are to be subjected to no other intentional suffering or indignity.

A prisoner of war, while attempting to escape, may be shot; but if captured neither death nor any other punishment shall be inflicted upon him simply for his attempt to escape, which the laws of war do not consider a crime. If, however, a conspiracy be discovered, the purpose of which is a united or general escape by force, the conspirators may be severely punished, even with death. Capital punishment may also be inflicted upon prisoners of war who have plotted rebellion against the capturing authority, whether in combination with fellow-prisoners or other persons.

Sick and wounded prisoners, as far as practicable, will be collected in hospitals designated by the Surgeon General for their exclusive use.

MARCHES.

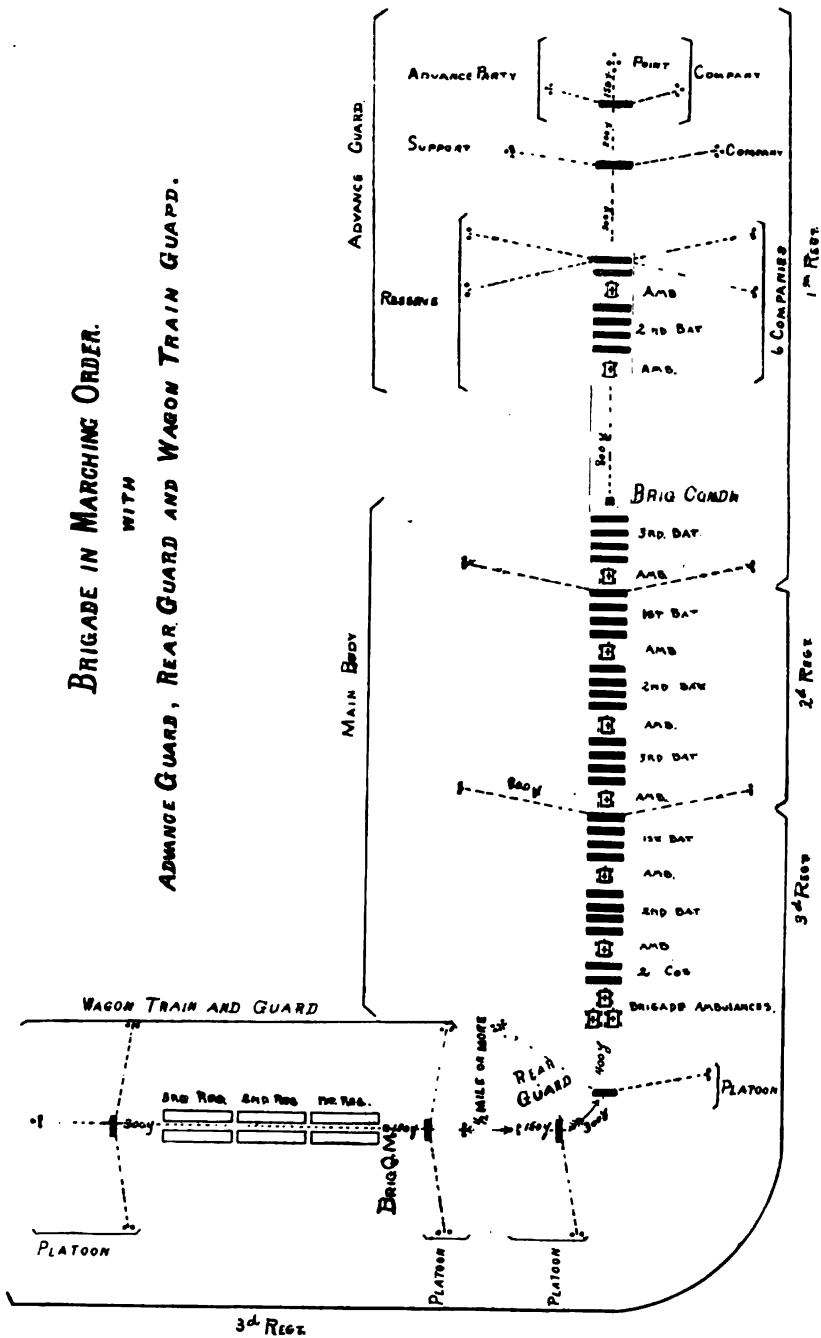
The Infantry Drill Regulations prescribe the length of step at "quick" time as 30 inches and at the rate of 120 steps per minute. This would take a command along at about $3\frac{1}{2}$ miles per hour. But a command should halt 15 minutes one-half hour after starting; thence hourly for five or ten minutes, and if the day's march be about 15 miles there should be a halt for 30 minutes half way. Many other things conspire to impede the progress of troops on the march. In the passage of defiles the leading troops make a short halt to enable the rear of the column to close up. Bridges also cause delay. In crossing an ordinary country bridge the step must be broken and the infantry move over in groups of forty to fifty men each; the cavalry in column of files. If the bridge be light, cavalry should cross by squads of from ten to twenty men each and wagons singly.

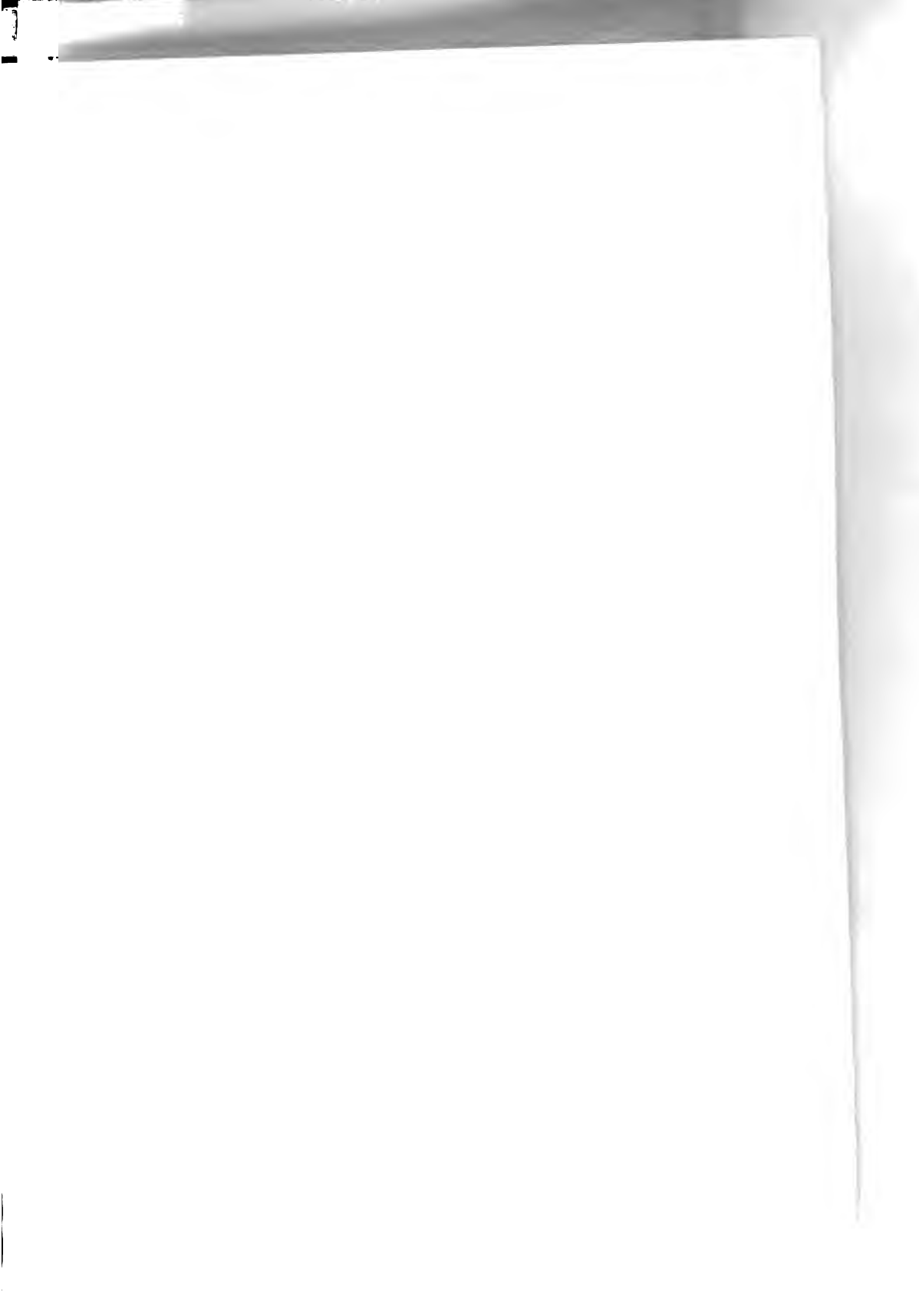
The average rate of marching therefore, including delays, may be reckoned as $2\frac{1}{2}$ miles per hour for infantry, 4 miles for cavalry and $3\frac{1}{2}$ miles for artillery, and the average daily march as 15 miles for infantry, 22 miles for cavalry and 18 miles for artillery. Ordinarily small commands of cavalry and infantry move over roads at "route march" in column of fours and artillery in column of sections, but in large commands it becomes necessary to shorten the marching column as much as possible, and when the nature of the country permits troops move in column of companies, or platoons.

The different regiments of a brigade, and battalions of a regiment usually alternate in leading the day's march.

Plate I illustrates a brigade of infantry in column of companies with its advance guard, rear guard and wagon train. The wagons would move in single or double column, depending upon the nature of the road. An ambulance should follow immediately after each battalion and the extra brigade ambulances would follow immediately in rear of the main column.

Plate I.







A regiment, a battalion or squadron, a company, troop or battery would be disposed for the march when operating independently, in the same general manner as shown in Plate I for the brigade, and the tactical movements for these commands are illustrated in Drill Regulations.

Troops marching in column with their baggage trains, average about three thousand men to the mile, consequently a brigade would occupy about a mile and a half for its main column and, including advance and rear guard, about three miles.

The rate of march of infantry must necessarily regulate that of the other arms. This requires frequent halts on the part of cavalry and artillery, and occasions additional fatigue to horses, but the necessity of keeping troops together is of the first importance when expecting battle.

A division occupies from three to five miles of road and may form for battle on the head of its main column in from one to two hours, or on the head of its advance guard in from two to four hours.

Plate II, illustrates the order of march and order of battle of a division serving independently. The "order of battle" is represented by dotted lines and as being formed upon the head of the main body of the marching column—the advance guard having fallen back and joined the main column.

An army corps of from 20,000 to 25,000 men on a single road occupies from six to ten miles for its main column, and about double that distance from the head of its advance guard to the rear of its rear guard, and would require from 2 to 4 hours to form for battle upon its leading subdivision, and from 4 to 8 hours to form upon the head of its advance guard.

As a rule not more than one corps should move on a single road and if possible each division should have a separate road.

Several columns advancing by parallel roads spread out the flankers and scouts of their advance guard until they connect, and thus cover the country in front by continuous lines.

FORCED MARCHES.

"Forced marches" become necessary when the emergency is great, and everything must be sacrificed to rapidity. For large bodies of troops the rate of

speed may be increased to 4 miles per hour, but it can seldom exceed 30 miles per day, and this rate of speed cannot be continued for more than two or three days without demoralizing a command. Such marches leave a large percentage of stragglers on the road and the men who accomplish them become too much exhausted for immediate service.

RECONNAISSANCE, SCOUTING AND CONTACT.

That armies may not meet an enemy unexpectedly or on unknown ground, commanders must gain information by pushing forward scouts and bodies of troops to gain contact with the enemy and under cover afforded by these advance parties collect supplies as well as information. Ordinarily this duty devolves upon the cavalry, but in broken and wooded countries infantry may appropriately be joined with the mounted troops, and when the country is mountainous or densely wooded, infantry is advanced alone for this duty.

This advance line is called a "screen" or "veil" usually designated the "cavalry screen" because cavalry usually conduct the operations in front of the line of sentinels and videttes of the outposts and advance guards which cover an army. The parties vary in size from an "officer's patrol" (a few men accompanying an officer) to "patrols" consisting of brigades and divisions organized into what are known as "cavalry raids."

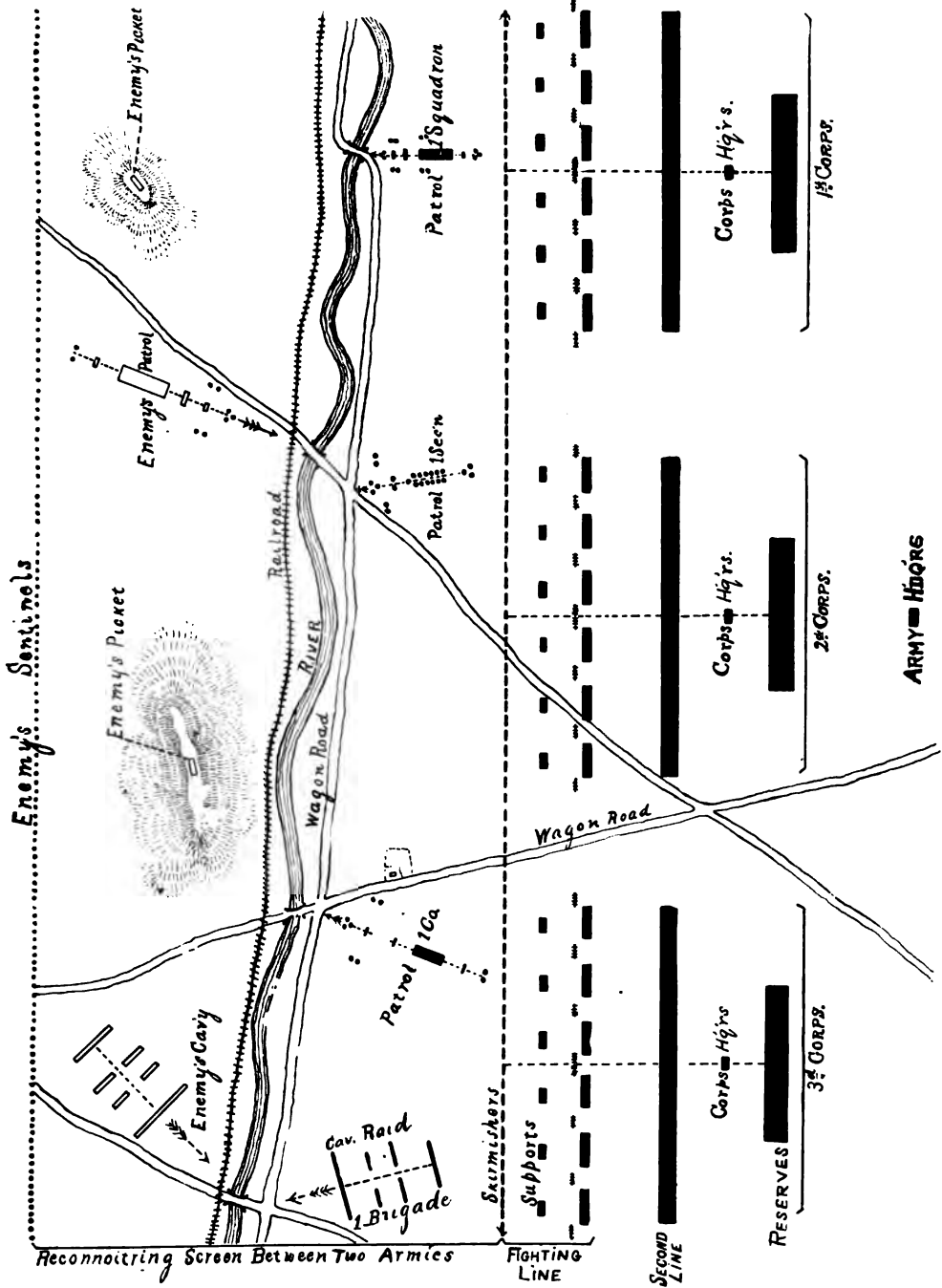
Plate III, though not constructed upon a uniform scale,* may serve to outline in a general way the "reconnoitring screen" between two opposing armies, and also the general disposition of troops for combat into three "lines;" the *fighting line*" which consists of the skirmish line, the line of supports and a line of reserves; a "*second line*" which consists of troops massed as supports to the fighting line, and a third line designated "*reserves*."

The general disposition of the army in bivouac or camp might assume about the same geometrical figure; the "skirmish-line" in the plate being considered as the sentinels of the "outposts." The front of such an army might be 20 to 30 miles.

The aggressive operations within the advance "screen" of an army include pushing back the enemy's advanced parties to develop the strength and location of his main force, covering the movements of our reconnoitring parties,

* The scale of the drawing is varied to bring into prominence some details which otherwise would be obscure.

Plate III.



seizing and holding strategic positions, gaining the enemy's rear, destroying his railroads and bridges, burning his manufactories and depots, capturing as many prisoners as possible, gaining all possible information from the inhabitants, gathering forage and supplies, taking possession of transportation routes and rolling stock, seizing maps, mails or documents, deceiving the enemy by artful devices, and transmitting all information gained to Army Headquarters to be compared and combined with that obtained from other sources, and laid before the army commander for his information and guidance.

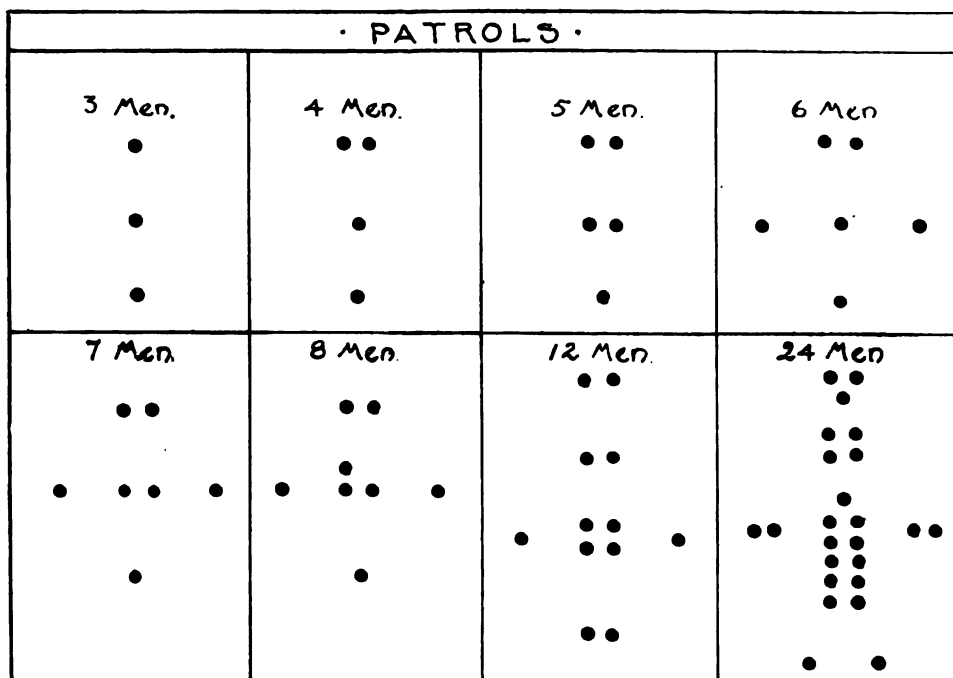


Fig. 55.

Figure 55 illustrates the general formation for small patrols moving along roads. For movement over an open or varied country patrols might be deployed as skirmishers, as prescribed in drill regulations. Larger patrols would be similarly formed as hereafter discussed and illustrated under the heading "advanced guards." The idea involved is the same for all commands, large or small, viz: To keep small groups of men in advance, on the flanks and in rear of the main body to observe, and prevent surprise.

Officers of the various staff departments accompany the commands moving in the "screen." In order that information may be collected and the proper orders resulting from it issued to subdivisions of the army, it is necessary that scouting and reconnaissance be carried far in advance of the main body, and even within the enemy's lines.

Contact with the enemy must be established and maintained at such a distance from the mass of our army that it may have time to concentrate for battle before the enemy can pass over the space between the advance of the "screen" and our main body. With an army of 150,000 men a concentration might be made under favorable conditions in from one to two days, therefore the "screen" between the outposts of two opposing armies will usually cover from fifteen to thirty miles. Napoleon laid down the distance at eight to ten leagues (twenty to twenty-five miles.)

CAVALRY RAID.

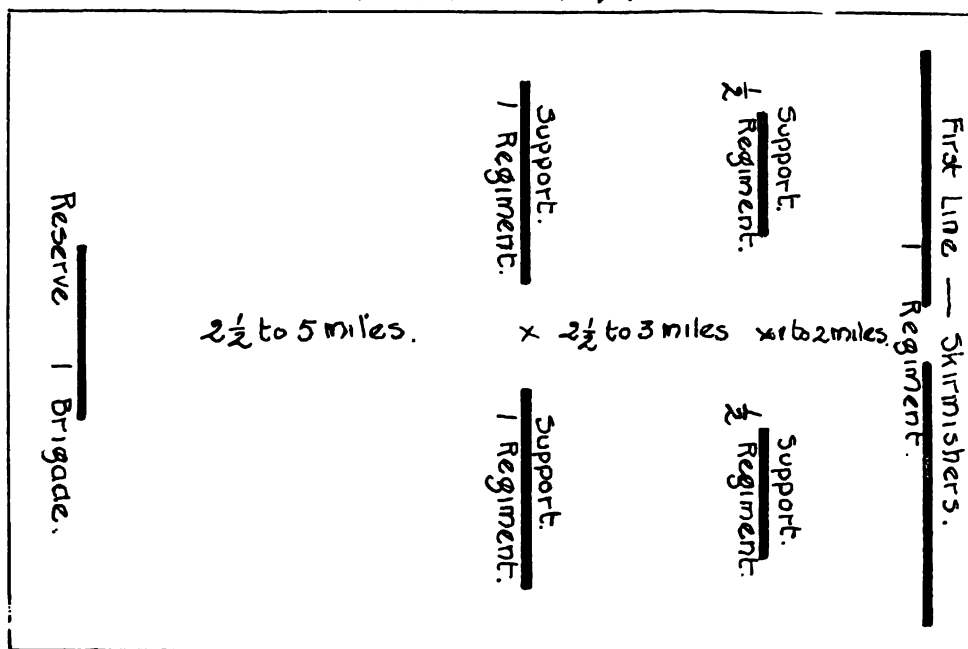


Fig. 56.

Figure 56 illustrates the general formation for a "cavalry raid," consisting of one division (three brigades of two regiments each). This geometrical figure

would, of course, be varied according to the nature of the country. The line of supports would be troops or squadrons moving at regular or irregular intervals as the roads or paths might lead. The advance line would be deployed as skirmishers and be about equal, numerically, to the first line of supports ; the second line of supports about double the first and the reserve about double the second line of supports. These proportions are to provide for a probable cavalry battle. If no battle is expected the first line would be extended and the supports and reserves correspondingly reduced.

Officers commanding scouting and reconnaissance parties should have a map of the country and every officer should carry a pocket compass, or better a compass known as the "box compass," (See Fig. 57) from which angles can be read easily and quickly by sighting along the cover.

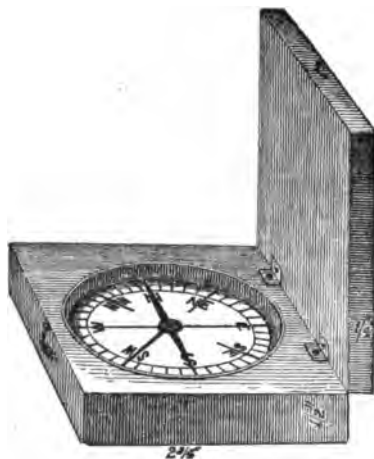
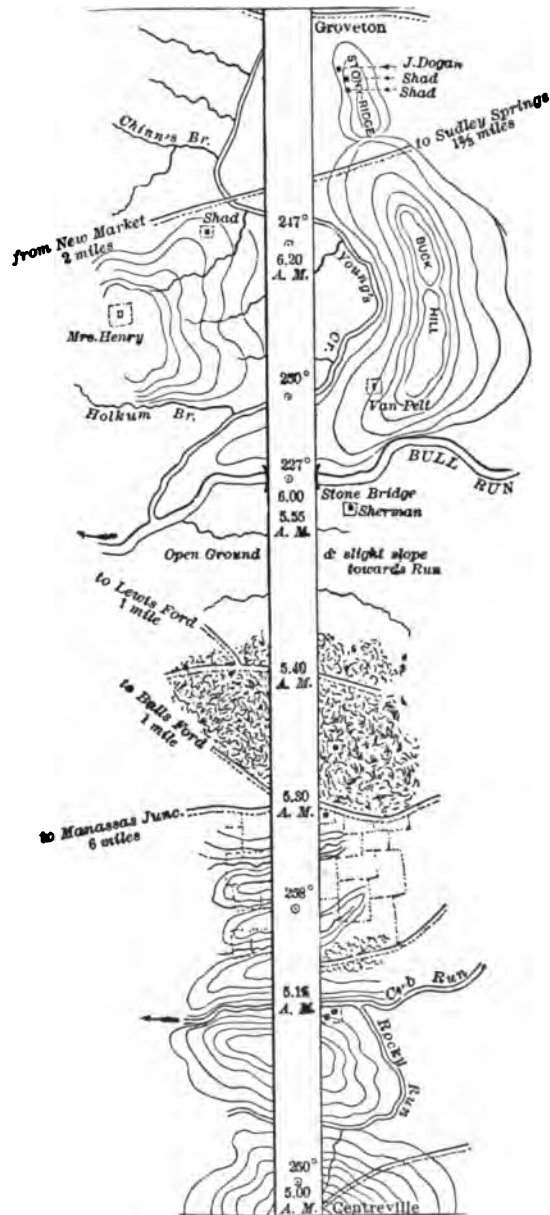


Fig. 57.

For determining distances passed over when marching on foot a pedometer, which may be carried in the pocket, is a convenient instrument, but by a little practice the distances can be very nearly guessed by timing the march with the watch. An officer can very soon learn the average speed of his walk or that of his horse by taking note of the time required to move over known distances and observing the precaution to move at a uniform pace. When wheeled vehicles accompany the troops, odometers may be attached to the wheels for measuring

Plate IV.



the distances and when using bicycles the cyclometer reading can be taken. By taking bearings along the road at every general change of direction, noting these and the distances between, making notes concerning the country to the right and left and sketching in by the eye the ordinary insinuosities, such a journal of march can be kept as will furnish data for a topographical map which can be finished up at a halt or at the end of the day's march.

About the best method of keeping field notes is that given by Professor Mercur in his "Elements of the Art of War," used by the cadets at West Point, and illustrated by Plate IV. The distances are noted thereon by the time required to march between stations, or objects, and as much may be sketched or written on the margin as desired.

Under this system the field notes, as far as made, can be sent in to headquarters any time and used as a map, and the "finished" maps can be made by a person other than the one making the reconnaissance.

A note book may be prepared by folding half sheets of letter paper (8 inches by 10 inches) once, so that the pages will be five inches wide; the left hand page to contain the notes and rough sketch and the right hand page the remarks. The scale adopted should be noted at the bottom of each page. For reconnaissances on horseback, a scale of three inches to the mile will represent the field notes with sufficient accuracy. The note book should be so held that the top is in the direction of the march.

Distances to the right or left of the route may be measured or estimated, but the notes should show whether they were actually measured or only estimated. Short distances can be "paced" with sufficient accuracy after a little practice. All remarkable features of the country such as hills, streams, fords, springs, houses, villages, forests, marshes, etc., and the places for encampment, should be noted.

If no compass is at hand, directions may be determined from the sun and time. The notes should include as much of the country as can be examined, on each side of the route, without delaying the command. Nothing will be sketched or mapped that is not positively known, or at least seen.

The "remarks" corresponding to any sketch should be as nearly as possible opposite the part described. They should give the general character of the

country, as prairie, rolling, hills, etc. ; general direction of the mountain ridges too far away to be measured ; the quantity and quality of timber, grass, water, etc.; whether streams not fordable are bridged, and if so, how ; if not bridged, can material for bridges or ferry be obtained in the vicinity. In brief, they should contain all information that may be of use in military operations, but in the fewest possible words. Streams, as far as their courses can be determined, should be sketched in as they are crossed.

The commanding officer of every body of troops ordered to march should select a competent person, preferably a commissioned officer, to whom he will intrust the special duty of making the field-notes and sketches, and keeping the journals.

For practice, students should go out for eight or ten miles on horseback, on bicycles or on foot, and bring in at least one such sketch of the route they travel over. For hasty sketches, a green pencil may be used for woods, blue for water, red for roads and black for the rest. For a "finished" sketch, the route should be plotted from the field notes in pencil and then inked. The direction of the magnetic meridian should be indicated on the map.

Variations of surface are now usually indicated by means of "contours,"—lines connecting points on the same level ; numbers being placed on the contours to show their height in feet (usually), above the datum plane.

These "contours" are shown in Figure 58, also a river and a small creek with bushes along the creek and forest trees higher up on the slope. In the upper left hand corner pine trees appear, represented by stars. The light is assumed to come from the upper left hand corner. The shadow of a tree is made elliptical. The manner of indicating a bridge is shown where the unfenced road crosses the river.

Lines called "hachures" are used in finished maps to indicate the variations in surface ; contour lines being first drawn in pencil, then the vertical "hachures" put in with ink and the contours erased. (See two hills in plate III.) This system involves too much labor for the ordinary sketch, and is becoming obsolete.



Fig. 58.

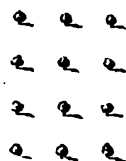
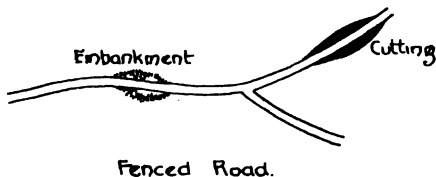
A simple and effective shading for military sketches, used in the English service, is a *mezzotint produced by dust from a soft pencil, rubbed in with a chamois or other blender—ridges and hill-tops being preserved in high light. This shading may be made permanent by means of gum water.

Figure 59 gives the topographical signs for cultivated land, ponds, grass, marsh, orchards, fenced roads, unfenced roads, cuts and embankments, churches, other buildings and gardens.

*See map in pocket of this book.



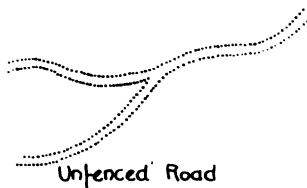
Pond and Grass



Orchard



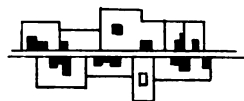
Artillery.



Unfenced Road

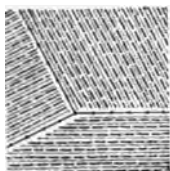


Church



Other Buildings.

Cultivated Land.



Marsh.



Trail.

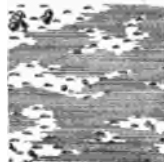


Fig. 59.

REPORT.

A written report should accompany a map ; but the report should not repeat what is already given on the map.

The nature of the reconnaissance will determine the nature of the report, whether it be the reconnaissance of a road, the reconnaissance of a railroad, the reconnaissance of a river, the reconnaissance of outposts, reconnaissance of position, or reconnaissance for supplies.

MAP READING.

It is necessary that every officer and non-commissioned officer be able to grasp quickly the meaning of topographical and other maps, and every officer should be able, with the aid of a map, to move to any place pointed out and to occupy it in any manner ordered ; and it is impossible for him to even discuss in-

telligently field operations without being acquainted with the topographical aspect of the case. As an aid to map reading, one should take the map of a piece of ground to some high point upon it and study how to recognize the different features represented. To read a map, first look for the largest body of running water, and from this trace up to their sources the tributary streams. The lowest part of the country is, of course, occupied by the largest body of water.

The eye will be able to trace the large streams for long distances by the trees that line them, and by reference to figures on the map, the elevation and character of the watersheds between the streams can be understood.

A model for topographical sketches is appended in the pocket of this volume.

CONVOYS AND THEIR ESCORTS.

The transports supplying an army may be divided into the "trains" which accompany it and are under its immediate protection, and the transports which operate in its rear and require a special escort—the latter are termed "convoys." The term "convoy" is also used to include both the transport and its escort.

CONVOYS BY RAIL.

Railroads furnish the greater part of the transportation of armies beyond the range of hostile cannon, and should, when practicable, be protected by guards stationed throughout their entire extent. The trains must also be protected against bodies of cavalry by "escorts" carried on the trains and held in constant readiness to disembark and repel an attack. When guards are not stationed along the railroad the safety of the trains should be assured by running a pilot engine ahead to discover damages that may have been inflicted to the track, bridges, etc.

CONVOYS BY ROADS.

These convoys are made up of wagons, pack animals, beef cattle, prisoners on foot, etc., and the size of the escort depends upon the size and value of the train, the character of the country and the distance from the enemy. It should be composed of infantry and cavalry and a few engineer troops—artillery is sometimes added to large convoys.

Large convoys should be divided into sections each of which extend over only about one mile of road. Ammunition should not be carried in the same

train with other supplies if it can be avoided, and if unavoidable the ammunition wagons should be together—either at the head or rear of the column.

At the close of a day's march, or when attacked, the wagons are "parked"—drawn up in a rectangle or circle within which the animals are picketed—the escort is disposed for defense within or without the enclosure as the exigencies require.

When the attack is sudden, the convoy may close up in double file and form as shown in Figure 60, the head of the column being halted, and the teams of the wagons turned inward, so as to face each other.

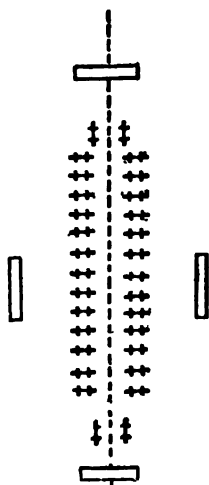


Fig. 60.

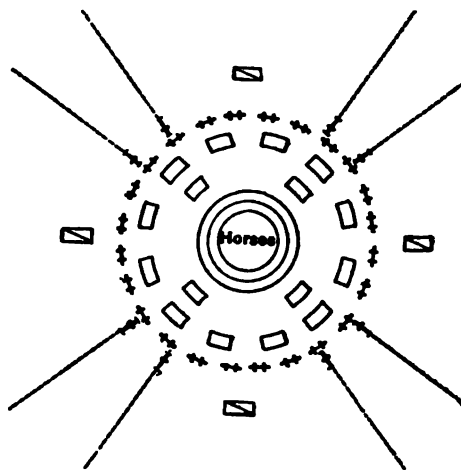


Fig. 61.

Figure 61 shows a circular formation when the escort consists of infantry, cavalry and artillery, the infantry being within the enclosure and the cavalry and artillery outside the line of wagons.

CONVOYS BY WATER.

Convoys upon rivers and narrow bodies of water are escorted similarly to those by land transportation—each boat having a small infantry guard, and a portion of the escort preceding and a portion following the convoy in boats; while cavalry march opposite the convoy, and as the advance and rear guard. When the river runs through a narrow valley, the main body of the infantry moves by land to prevent the enemy from occupying, and operating from, surrounding heights.

On the sea, convoy duty is, of course, performed by the navy. Upon large, navigable streams the land and naval forces frequently combine for this duty, as was often done upon western rivers in the war of secession.

ARTILLERY AND ENGINEERS.

The artillery and engineers will be organized in each army according to the nature of the service and the theatre of operations. They will, as a rule, constitute special commands, under their own officers, but when assigned to army corps and divisions will be on the footing of other troops attached for service.

Under ordinary circumstances, from two-thirds to three-fourths of the field batteries will be distributed to the army corps, or to divisions, and in proportion to the strength of those commands. The remaining batteries will be organized into brigades, and will constitute the reserve artillery of the Army.

The ammunition columns, with artillery material, the tools, etc., required for general repairs, will constitute the general park of that corps.

If it is probable that a siege train will be required, it should be organized, instructed, and held in depot until needed. When brought forward, it will report directly to the commander of the artillery for instructions.

The reserve artillery of the Army and the artillery brigade of each army corps should, as far as practicable, be kept together; but on the march, or in camp, or when near the enemy, additional batteries may be attached temporarily to divisions, due provision being made for their proper supply.

If the Army be not organized into army corps, a superior officer of artillery will be assigned to command the artillery of each division. He will also act as chief of artillery upon the staff of the division commander.

The organization, distribution and service of the engineers are arranged on the same general principles as the artillery.

The engineer park, with the reserve pontoon trains, and two or more regiments of engineer troops, will be under the command of an engineer officer, who reports to and receives the orders of the officer commanding the engineers of the

Army. When circumstances make it expedient, either on the march or near the enemy, engineer troops and brigade equipage may be distributed to army corps or to divisions.

If the Army is not organized into army corps, a superior officer of engineers will be assigned to the command of the engineers of each division, which will consist of one or more battalions of engineer troops and the necessary bridge equipage, material, and stores. He shall also act as chief engineer on the staff of the division commander.

Commanders of artillery and engineers receive directly, or through the chief of staff, the orders of the general officer under whom they serve.

CIVILIANS.

Civilians employed with the Army will carry with them certificates of their employment from the headquarters employing them.

Private servants will not be allowed to wear the uniform of any corps of the Army; and each will be required to carry with him a certificate from the officer who employs him, verified, for regimental officers, by the signature of the colonel, for other officers under the rank of colonel, by the chief of their corps or department.

BATTLES.

The disposition of the troops and the manner in which the battle is to be conducted will be prescribed by the commander in orders. The line of retreat should be announced to subordinate commanders only. The location of field hospitals, depots of ammunition and trains should be made known to the troops generally.

The station of the commander should be made known to subordinate commanders and marked by a headquarter's flag, so that it may be found by staff officers and messengers. The commander should retain the "reserve" under his own control to be thrown into action at the decisive moment. He can with propriety only

lead his troops personally, to rally them in an emergency. In all other cases his place is at some commanding position reasonably secure from fire, where he can overlook and direct the battle as a whole.

Battle tactics will be discussed more in detail in Chapter X.

During the action, the officers and non-commissioned officers keep the men in the ranks and enforce obedience if necessary. Soldiers must not be permitted to leave the ranks to strip or rob the dead, or even to assist the wounded, except by express permission, which is only to be given after the action is decided. The highest interest and most pressing duty is to win the victory, by winning which only can a proper care of the wounded be insured.

After an action, the officers of ordnance collect the munitions of war left on the field. The Quartermaster's Department collects the rest of the public property captured, and a return of all captured property is made to headquarters.

Within ten days after the close of every engagement, the commanding officer of each regiment, separate battalion, and light battery concerned, will prepare and forward to the next superior headquarters, a concise report of the part taken therein by his command, including the effective strength of the same, and the losses incurred, under the separate heads of killed, wounded and missing.

Such reports are consolidated at superior headquarters and forwarded through the military channels to the Adjutant General of the Army.

FIELD HOSPITAL SERVICE.

There are in each company four privates designated as "company bearers." During an engagement or in an emergency the company bearers may be directed by their immediate commanding officers to fall out and give first aid to the wounded, or carry them to the rear until relieved by members of the Hospital Corps, and when so relieved they will immediately join their companies. In campaign, company bearers wear a red brassard around the left arm.

To each regiment are assigned three medical officers, three non-commissioned officers and eight privates of the hospital corps, distributed for duty with the three

ambulances assigned to the three battalions of the regiment. At these ambulances, the injured are received from the company bearers.

In each division one "field hospital" is established with accommodations for 500 patients. At this field hospital one bearer company and one ambulance company are stationed, giving a total strength of 44 medical officers and 274 enlisted men of the hospital corps to the division. The duties of the bearer company are to establish dressing stations and carry the wounded to them that they may receive such bandaging and attendance as is necessary before their removal to field hospitals. The duty of the ambulance company is to convey the wounded to the field hospital.

Each corps has a hospital reserve sufficient to expand the capacity of the field hospitals to 2000 patients. General hospitals, to which the sick and wounded are sent for extended treatment, are established farther to the rear, either at the base of operations or at convenient points on the line of communication with the base. General hospitals are under the exclusive control of the surgeon general' and hospital transports, boats and railway trains, after being properly assigned as such, are exclusively under the control of the medical department, so that they will not be diverted from their special purposes.

MOVING TROOPS BY RAIL.

When the distance is great, railroad transportation is much more rapid than marching, and, of course, becomes a necessity even for whole army corps; but the advantage of moving large bodies of troops by rail in the vicinity of the enemy is questionable. It is generally considered better to "*march*" an army and leave the railroads free to carry the supplies, the sick and wounded. It was found in the Franco-German war that even upon double track railroads large bodies could not move faster by rail than by marching when the number of men exceeded 435 per mile of distance to be traversed, and for volunteer armies such as would begin a campaign in the United States the advantage of the discipline of the "*march*" would greatly overbalance the gain in time that could be effected by railroad movements within the theatre of operations of an army.

SUPPLYING TROOPS IN CAMPAIGN.

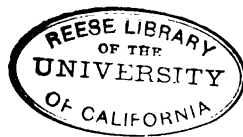
The details involved in manufacturing, purchasing, carrying forward and issuing supplies to an army are extensive and pertain to the several staff departments. The subsistence, ordnance, medical departments, etc., attend to purchasing and issuing their respective supplies, but the quartermaster's department besides purchasing all miscellaneous supplies, furnishes transportation for all the "arms" and departments. Besides the railroad and water transportation, one-fourth as many animals as men are required, including the cavalry and artillery horses. Depots of supplies are established at safe and accessible points in the rear at railroad centres, and supplies are taken to sub-depots near the armies in the field and from these depots as near the fighting lines as practicable by rail. Wagon trains then receive and take them to the troops. Baggage trains, part of the ammunition and medical supply wagons and the ambulances move with the troops and park at a safe distance in rear during battle. These trains are fed by general supply trains coming from railroad depots, in the rear.

FORAGING.

Supplies for the main army generally come from the depots in rear, but the reconnoitring parties of the advance "screen" necessarily live upon the country, and under their cover as many supplies are gathered in from the enemy's country as possible.

Soldiers should never be permitted to seek food or clothing for themselves. The foraging should be conducted through authorized officers. It is the practice of modern armies to purchase the supplies from the inhabitants and to afford every facility for bringing them in. When sufficient supplies are not brought in voluntarily and when the civil officers can control the inhabitants, requisitions may be made through the civil officers, but failing in this, forced requisitions are finally resorted to.

CHAPTER VI.



Castrametation.

Castrametation in its strictest technical sense is the art of laying out camps and placing the troops so that the different arms of the service afford support to each other. No universal rules can be laid down. The proper exercise of the art is to so place the troops that they can quickly form line of battle on the position they are to occupy, and at the same time have as many facilities for providing their food and comforts as possible. Under this head some of the details involved in caring for troops in the field will be considered.

CAMP, BIVOUAC AND CANTONMENT—DEFINED.

Troops at rest are said to be in "*camp*" when in tents or huts, and when it is probable that they will remain some time; they are said to be in "*bivouac*" when they have no shelter except such as each soldier carries or is able to improvise with material available in the vicinity, or when near the enemy and when they are to remain but a short time; and they are said to be in "*cantonment*" when lodged in houses and inhabited places and ready to resume military operations at short notice.

CAMPS.

A reconnaissance by a staff officer conversant with the plans of the commander should precede the establishment of a camp. When not near the enemy, it will be necessary to look only to the health and comfort of troops, the conveniences for supplying water, wood and forage, and the lines of communication by which general supplies can be furnished.

A "camping party" from each regiment consisting of the regimental quartermaster and quartermaster sergeant and a corporal and two men per company

go ahead to prepare the camp for the regiment. The General decides whether the regiments camp separately or together, and whether the police guard shall accompany the camping party, or a larger escort shall be sent.

Neither baggage nor led horses are permitted to move with the camping-party.

The staff officer who has made the reconnaissance should accompany the camping parties which are in charge of the chief quartermaster of the command, who allots the grounds to the several regimental quartermasters, who allot the grounds to the several battalions and companies of their regiments and station men to show the commanders of these subdivisions where to go as they arrive.

The regimental baggage trains which are under the supervision of the regimental quartermasters are united for the march into brigade trains under the brigade quartermaster, and the brigade trains are united into a division train under the direction of the chief quartermaster of the division and each division is followed by its train. The several trains march in the division in the same order as the troops to which they belong, and when these trains arrive in camp they are sent to their respective commands.

The watering places are examined, and signals placed at those that are dangerous. Any work required to make them of easier access is done by the police guard or quartermaster's men. Sentinels to be relieved by the guards of the regiment when they come up, are placed by the camping party over the water if it is scarce, and over the houses and stores of provisions and forage in the vicinity.

A camp should be upon dry ground susceptible of drainage with plenty of wood and water close at hand, and the water should be of the best quality available. Low bottom land should be avoided as far as practicable.

On reaching the ground, the infantry form on the color front; the cavalry in rear of its camp.

CAMP OF AN INFANTRY REGIMENT.

Plate V shows the general plan of camp of a regiment of infantry, consisting of three battalions.

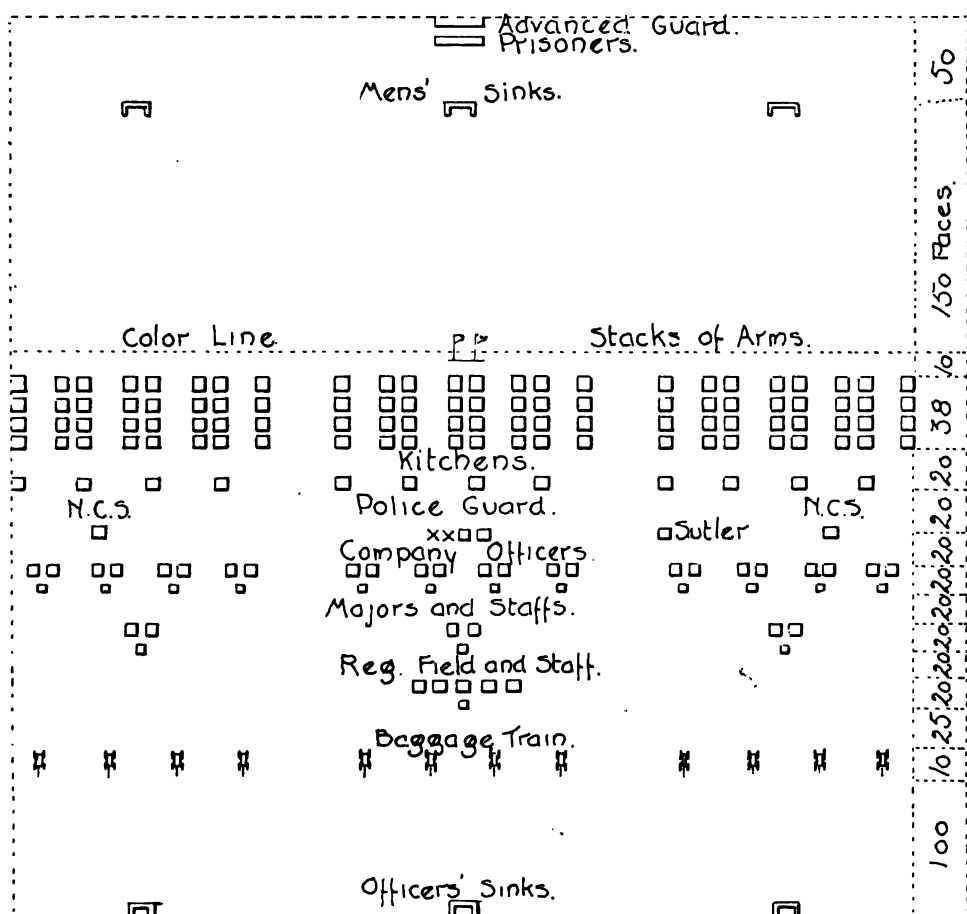


Plate V.

Upon arriving in camp, the number of men to be furnished for guards, pickets and orderlies; the fatigue parties to be sent for supplies; the work to be done, and the strength of the working parties; the time and place for issues; the hour of marching, etc., are announced by the brigadier generals to the colonels, and by them to the field officers,—the adjutant and captains formed in front of the regiment, the first sergeants taking posts behind the captains. The adjutant then makes the details, and the first sergeants warn the men. The regimental officer of the day forms the pickets or outposts and sends the guards to their posts.

The colors are then planted at the centre of the color line, and the arms are stacked on the line; the fatigue parties to procure supplies, and the working parties, form in rear of the arms; the men not on detail pitch the tents. After the tents are pitched the command forms on the color line, stacks are broken, colors sent to the colonel's tent under escort, companies march to their separate company streets and are dismissed; each man taking his rifle to his tent.

If the camp is near the enemy, the picket remains under arms until the return of the fatigue parties, and if necessary is re-enforced by extra details.

Each infantry company has its tents in two files, facing on a street perpendicular to the color line. The width of the street depends on the front of the camp, but should not be less than 5 paces. The interval between the ranks of tents is 2 paces; between the files of tents of adjacent companies 2 paces, and between battalions and regiments, that laid down in drill regulations.

The *"color line" is ten paces in front of the front rank of tents. The company† kitchens are 20 paces behind the rear rank of company tents; the non-commissioned staff and sutler 20 paces in rear of the kitchens; the company officers 20 paces farther in rear.

The company officers are in rear of their respective companies; the captains on the right.

The majors and their staffs are 20 paces in rear of the line of company officers, each major opposite the centre of his battalion.

The colonel is in rear of the centre of the regiment; the lieutenant colonel on his right; the adjutant on the left of the colonel; the other staff officers on the left of the adjutant.

The kitchens of the officers are in the rear of their tents.

The police guard is at the centre of the line of the non-commissioned staff, the tents facing to the front.

* During pleasant weather, in the day time, the guns are usually stacked on this line and the "colors" furled and laid on two adjoining stacks,—one or more sentinels guard the colors when they are on the "color line."

† The kitchens may be 20 paces in front of the company tents, when that ground is not to be used for parade purposes.

1

The advance post of the police guard is about 200 paces in front of the color line and opposite the centre of the regiment; the prisoners' tent about 4 paces in rear.

The horses of the field and staff officers and the baggage train are 25 paces in rear of the tents of the colonel and his staff; the wagons are parked in one line and the men of the train camped near them.

The sinks of the men are 150 paces in front of the color line, those of the officers 100 paces in rear of the train. Both are concealed by brush.

If it is desirable to reduce the front, the tents of companies may be pitched in single file, and when the conical wall tents are used, it is good arrangement to pitch the tents in one line in rear of the color line and parallel to it.

One of the first things to be attended to is drainage, so that the water falling upon the ground will be quickly carried away. A shallow ditch should therefore be dug around each tent, connecting with a main ditch which will take the water off the camp ground.

BREAKING CAMP.

"The General," sounded from the trumpet or from the drum and fife, one hour before the time of marching, is the signal for packing up effects, striking tents and loading wagons. All fires should then be put out.

It is customary under ordinary conditions of service to stack arms on the color line, and lower the tents together at the trumpet signal.

In all permanent camps or camps of instruction there should be a flag staff for flying the "National flag" during the day, and each night at sunset, and at the breaking of camp the troops should be paraded on the color line and the band should play the "Star Spangled Banner" while the flag is being lowered. If there be artillery present at the breaking of camp, a salute of 21 guns should be fired just before the flag is lowered and while the troops are paraded.

POLICE GUARD.

In each regiment a "police guard," (see Plate V.) is detailed every day, consisting of two sergeants, three corporals, two musicians, and men enough to furnish the

required sentinels and patrols. The men are taken from all the companies, from each in proportion to its strength. The guard is commanded by a lieutenant, under the supervision of a captain, as regimental officer of the day. It furnishes 10 sentinels at the camp; one over the arms of the guard; one at the colonel's tent; three on the color front (one of them over the colors); three 50 paces in rear of the tents of the colonel and staff; and one on each flank, between it and the next regiment. If it is a flank regiment, one or more sentinels are posted on the outer flank.

An advance post is detached from the police guard, composed of a sergeant, a corporal, a musician, and nine men to furnish sentinels and the guard over the prisoners.

The advance post furnishes three sentinels; two a few paces in front of the post, opposite the right and left wing of the regiment,—posted so as to see as far as possible to the front,—and one over the arms and prisoners.

CAMP OF THE CAVALRY REGIMENT.



In the cavalry, each troop has one row of tents perpendicular to the front of the camp, the men's tent opening towards the horses.

Plate VI. shows the general plan of camp of a regiment of cavalry composed of three squadrons,—back as far as the line of captain's tents—the squadrons being in "column of troops" at full distance. The field officers and baggage trains are in rear of the captain's line, as in the camps of an infantry regiment.

The horses of each troop are tied to a "picket line" stretched on the ground and fastened to pickets from 6 to 15 paces in front of and parallel to the line of tents of the men. (See Fig. 62.)

The strength of the troops fixes the depth of the camp and the distance between the rows of tents and the tents in each row. The forage is placed between the tents, at the points as indicated by the letter "f" in Plate VI.

Regiments frequently camp in line leaving the tents in one continuous line 15 yards in rear of the line of horses, as when in bivouac.

 Advanced Guard
 Prisoners.

Mens' Sinks.



Kitchens.

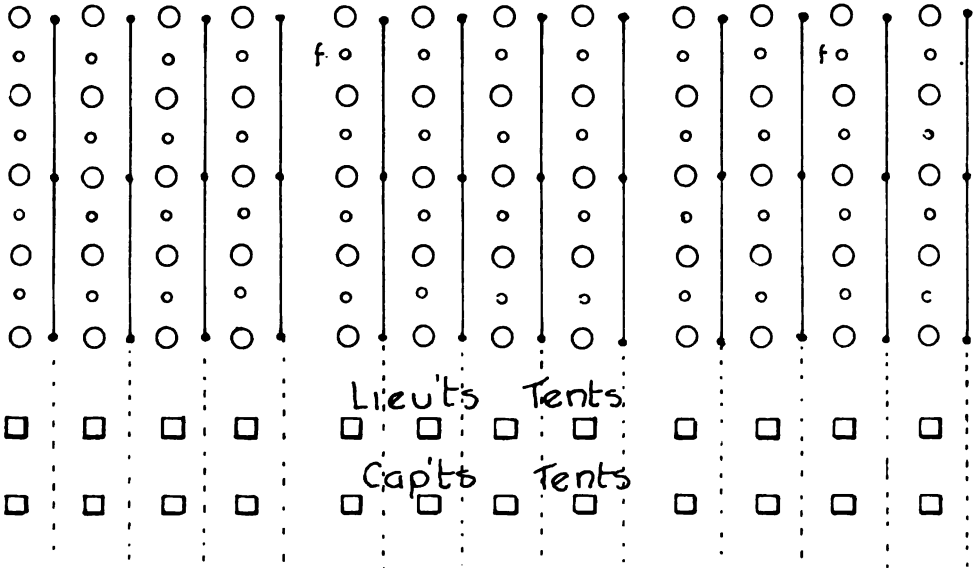


Plate VI.

CAMPS OF INSTRUCTION.

Camps of instruction are usually supplied with tentage far in excess of campaign allowances, and are laid out with extended intervals, and with a view to the

comfort of troops and their drill manœuvres rather than their formation for actual battle, and kitchens, sinks, store tents, baggage trains and picket lines are usually located away from the company streets and parade grounds.



Fig. 62.

COMPANY CAMP.

Plate VII gives a model arrangement for a camp of instruction for a separate company of infantry or troop of cavalry, when the troops are to remain in camp some time.

The captain has a wall tent, the two lieutenants a wall tent together, the surgeon a wall tent for himself and one hospital tent for use as a hospital for the command. There should be one or more conical wall tents pitched together to cover the stores in bulk, and either "conical wall tents" or "wall tents" for the officers' mess and the company cook house. The "conical wall tent," see Fig. 63, is now habitually used in the army for the men, and for store tents. This is a circular tent $16\frac{1}{2}$ feet in diameter, with a wall three feet high, and accommodates sixteen men, who lie with their feet to the centre. It has one pole at the centre which rests on a tripod, under which a Sibley stove, see Fig. 64, may be placed when required.

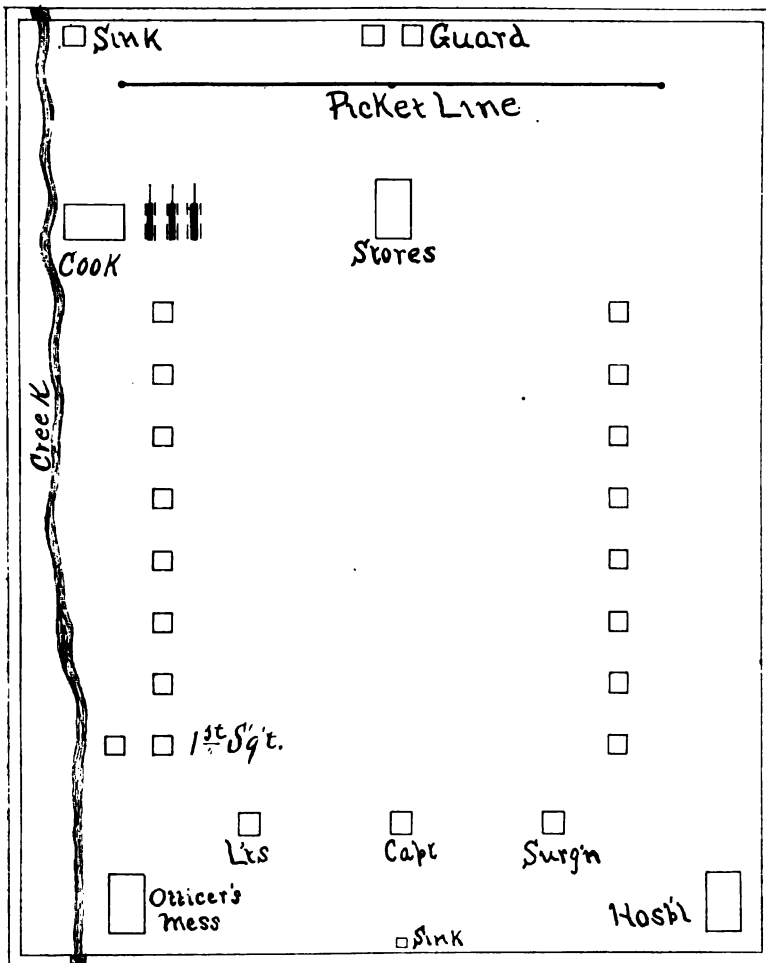


Plate VII.

Fig. 65 illustrates the "wall tent" which is 9 feet square on the ground with a wall 3 feet 6 inches high. It has a "fly" covering it, so as to leave an air space over the roof of the tent—between the roof and fly.

The "hospital tent" is of the same model as the wall tent, 14 feet long by 15 feet wide on the ground, with a wall $4\frac{1}{2}$ feet high. Fig. 66 illustrates the "common" or "A" tent, sometimes issued for the men in the place of the conical wall tent. It has no wall, is 7 feet square on the ground, about 7 feet high at

the ridge and holds six men.

Fig. 67 illustrates the *shelter tents, pitched for a company.

Each man carries rolled over his blanket the half of a shelter tent, and the halves are buttoned together to form shelter for two men.



Fig. 63.

In camp of instruction the “picket line” to which the animals are tied, is usually placed some distance from the men’s tents, to avoid flies and odors as much as possible, (see Plate VII) and on the down-stream side of the camp and near the store tent, so that the No. 1 sentinel of the guard can supervise both animals and stores. The wagons are parked near the guard tent. If the camp is to be surrounded by sentinels, No. 2 post would be on the right side, No. 3 back of the officers’ line and No. 4 on the left side of camp.



Fig. 64.

To lay out the camp, lines are stretched on each side of the company street to mark the fronts of the two lines of tents.

It is customary, for the purpose of instruction, to have the tents raised together at a signal from the trumpet, the captain first causing the trumpeter to

sound “attention” as a preparatory signal, and when all tents are ready the signal for raising the tents is sounded. This second signal may be one note from the trumpet.

*Rice model, which also serves as a rain cape.

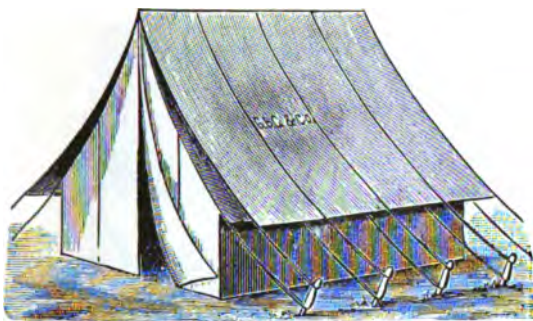


Fig. 65.

upright poles are then inserted and the pins on top of the upright poles put through the holes at the ends of the ridge pole and the eye-holes of both the tent and fly.

At the signal for raising, two men raise the upright poles to a vertical position and other men fasten the corner ropes of the tents to the pins. The tents are then aligned, the remaining pins driven and the ropes fastened to them.

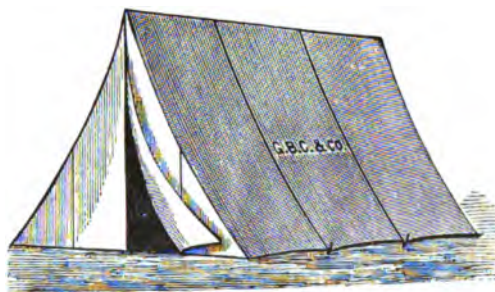


Fig. 66.

To pitch a conical wall tent, the position of the pole is established as the centre and by means of a cord held at that point by one end, the circles upon which the pins are driven are marked out, and the pins are driven previous to raising the tent.

CAMP COOKING.

Each company, troop and battery has its separate cooking outfit for the men, and the officers with each company, troop or battery usually constitute one mess by themselves, and have a smaller outfit.

Fig. 68 illustrates the "Buzzacott" oven used by each company when in a permanent camp, or when supplied with sufficient transportation for carrying it.



Fig. 67.

The largest size will do the cooking for seventy-five men. The primitive method illustrated by Fig. 20 (page 91) is, however, the ordinary one in campaigns, where only camp kettles, mess pans and frying pans can be carried.

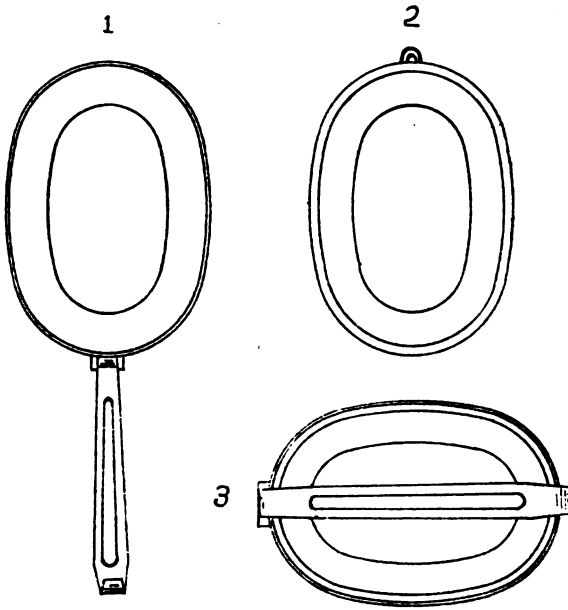
One experienced cook is permanently detailed in each company as head cook and one assistant cook is detailed daily or for short periods.



Fig. 68.

Length, 8 inches; width, $6\frac{1}{2}$ inches; depth of whole can, $1\frac{1}{2}$ inches when close; the lower dish to be 1 inch in depth; the plate $\frac{3}{4}$ inch in depth. See Fig. 69.

*Page 21, Part I.



1 Soup plate 2 Plate
3 Meat Can, Closed.
Fig. 69.

To the deeper dish or plate is attached a light iron handle, which folds over and holds the two together. The one with the handle may be used to eat soup out of; as a frying pan; or to warm up cold food, and many other purposes that will suggest themselves when it is used.

These articles are, on the march, placed in the haversack which also contains the rations required to be carried by the soldier and, with the tin cup which is used for cooking coffee, and the canteen, constitute the cooking and eating utensils that

are deemed essential for use upon the most active service, where each man does his own cooking.

COMPANY OFFICERS' MESS.

The captain, the two lieutenants, and if the company be serving alone, the surgeon would mess together, and require the following outfit:

1 "Buzzacott Camp Cooking Outfit," (Sporting size; which packs in the size of a small hand valise. (See Fig. 70.)



Fig. 70.

Folding camp table, about one yard square.

4 Folding camp chairs.

1 Chest 22 inches long, 18 inches wide and 14 inches high (outside dimensions) made of one inch pine lumber with com-

partments for holding the following articles :

- 6 Agate or enamel ware plates.
- 4 “ “ “ cups.
- 4 “ “ saucers.
- 4 “ “ “ soup bowls.
- 4 “ “ “ vegetable dishes, (about 10 inches.
- 1 “ “ “ meat platter, (“ 14 “)
- 1 “ “ “ coffee pot, (2 quarts.)
- 1 “ “ “ water pitcher, (“)
- 1 “ “ “ milk pitcher, (1 pint.)
- 1 “ “ “ sugar bowl.
- 4 “ “ “ tumblers or mugs for *water*.
- 1 Carving knife, fork and steel.
- 4 Knives.
- 4 Forks.
- 6 Tablespoons.
- 6 Teaspoons.
- 1 Vinegar cruet.
- 1 Pepper.
- 1 Salt.
- 1 Agate or enamel ware butter dish.
- 1 “ “ “ syrup cup.
- 1 Rough box three feet square with cover, for ice.

The officers select one of their number as “caterer” for their mess and employ an experienced field cook.

OFFICERS’ BEDDING.

Each officer should have for field service a roll of bedding with a piece of heavy canvas 3 yards long by 2 yards wide for the outside cover, and two heavy straps with buckles for closely confining the roll. The roll should contain a thin *single* mattress, a small feather pillow, a rubber blanket, two woolen blankets, a comfortable and two *single* sheets, and within the roll he will be able to carry a

change of underclothes and the necessary toilet articles. When transportation is limited the mattress, comfortable and sheets will be omitted.

When transportation will allow a *single* folding cot should be carried with the bedding roll. When sleeping on the ground, hay, straw or boughs should be put under the bed,—the canvas and rubber blanket being spread under the mattress.

LIGHT BATTERY CAMP.

Plate VIII gives the plan of a camp for a light battery of artillery, conveniently located upon a stream.

INTRENCHED CAMPS.

Camps are generally established on a single line, but if the army is formed in two lines there are two camps—one in front of the other and the reserve has its particular place, usually comprising a third line in rear of the second. The artillery and engineers are usually encamped in rear of infantry and the cavalry on the flanks in line with the infantry.

When the camp is to be an intrenched one, the reconnaissance should include the defensive properties of the ground and the best location for the field works. "Intrenched camps" have for their object the defense of a given position and for this purpose are strengthened by fortifications. In active campaigning the ordinary "camp on the march," though troops do not expect to fight, should occupy such positions that they can readily repel an attack.

It often happens during active operations that troops go into camp expecting to stay only for a night, but circumstances prolong their stay and the hasty selection of the night's encampment becomes a defensive position. In fact during the War of Secession troops acquired the habit of intrenching their lines immediately upon halting after a day's march, when near the enemy.

All camps should therefore be selected upon military principles governing defense. Hasty intrenchments will be considered under the head of "engineering," Chapter IX.

BIVOUACS.

Troops without camp equipage and when on the march are obliged to go into bivouac. They are frequently compelled to bivouac if the enemy is quite near, even when possessing the proper camp equipage. The same general rules laid down for camps are applicable to bivouacs.

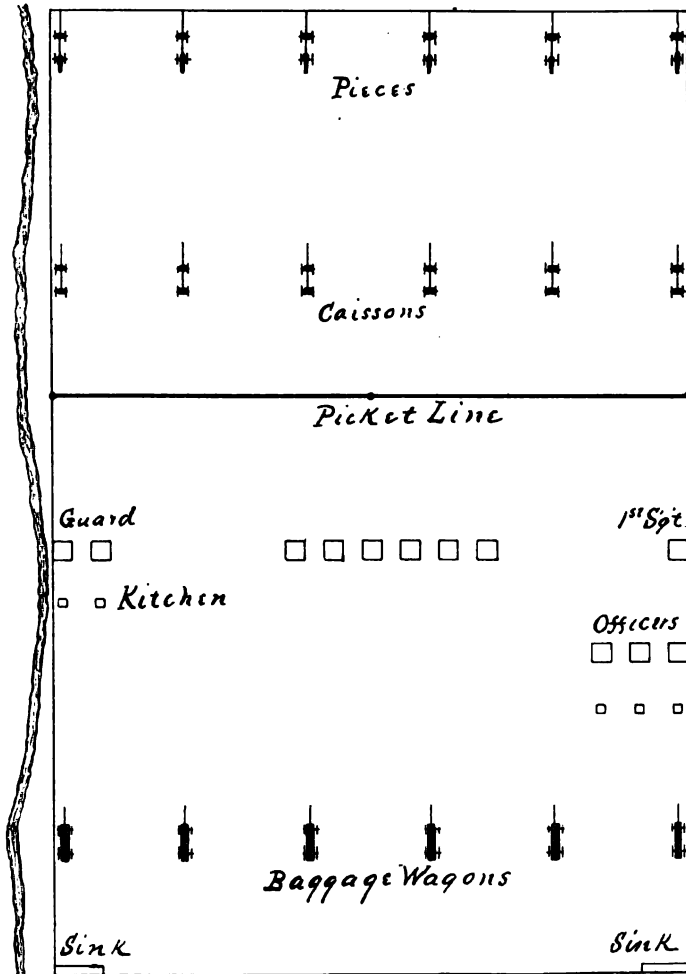


Plate VIII.

Regiments of infantry usually bivouac in line of battle, stacking arms in front and making their fires in rear of the stacks, and making such shelter as they

can about the fires. The company officers' fires are in line in rear of their men and the field and staff in line back of the company officers.

Regiments of cavalry bivouac in similar order with the "picket line" for their horses in front of the men's fire. While artillery can have no fixed rule for its bivouac, the following is a good arrangement; the line of fires for cannoneers and drivers in front; the picket line for horses in the rear of the cannoneers and the pieces, caissons and wagons parked in rear of the horses in two ranks. The officers to have their fire in front of the men, or on one flank.

When troops bivouac and have no shelter tents, men may be comfortable by sleeping with their feet towards the fire and sheltering themselves from the wind by means of hastily constructed sheds, bowers, etc. In woods there are good facilities for making warm encampments, even in the coldest weather. A young

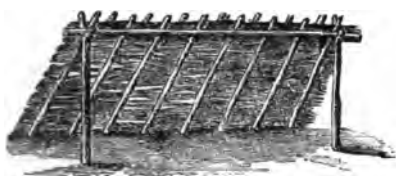


Fig. 71.

tree when felled yields poles to support branches as a shield against weather and flooring above the snow or damp ground. Fig. 71 shows a common shelter,—a cross-bar is supported by two uprights; against the cross-bar

a number of short poles are leaned; on the back of the poles fir branches are laid horizontally.

A cloth of any kind may give shelter in a similar way. (See Fig. 72.)

The soldier should give his first thought to his gun and ammunition, and have them ready by his side at night to be taken quickly. When liable to surprise, the infantry should stand to arms at day break and the cavalry mount until the return of the reconnoitring parties. If the arms are to be taken apart to clean, it must be done by detachments successively.

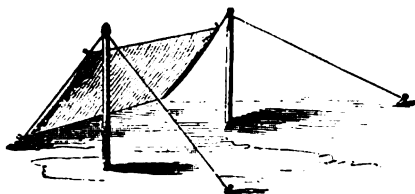


Fig. 72.

CANTONMENT.

An army goes into cantonment in winter which as a rule puts an end to active

operations, and the troops occupy such buildings as may be found available or rudely constructed.

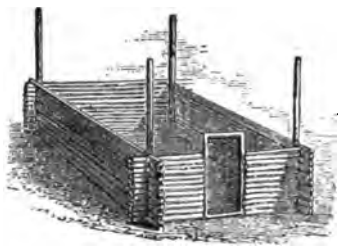


Fig. 73.

Fig. 73 illustrates the log hut which soldiers can quickly construct in wooded country. Any kind of a roof, even a tent fly, can cover it and by filling air cracks between the logs with mud it makes a comfortable habitation. The materials of which the walls of huts may be constructed are very numerous, e. g., bricks, sunburnt or baked, stones, bags filled with sand, turf, bark, boards, etc. Tents over excavations in the ground are also extensively used as habitations for troops during severe weather.

BARRACKS.

The permanent buildings in which troops are quartered in time of peace, or when occupying a permanent military post are called barracks.

The western frontier of the United States, which has been the practical training school for the officers of our armies from Washington's day to the present, contains many military posts, which are technically called "forts,"—though this term is to some extent a misnomer, as most of our western frontier posts have no defensive works, but are merely garrisons for troops.

Mixed garrisons of from two to ten companies, made up of cavalry or infantry, and sometimes light artillery, are stationed at these military posts.

Plate IX shows the plan of Fort Custer in Montana, which may be taken as a fair illustration of Western posts. It is situated at the junction of the Big Horn and the Little Big Horn rivers, thirty miles south from where the Big Horn empties into the Yellowstone River, and twelve miles south of the Custer battlefield.

The parade ground is about one-quarter of a mile long and one-eighth of a mile wide, and is smooth and level for military manœuvres. On one side of the parade are twenty-two houses for officers—most of them being double houses—

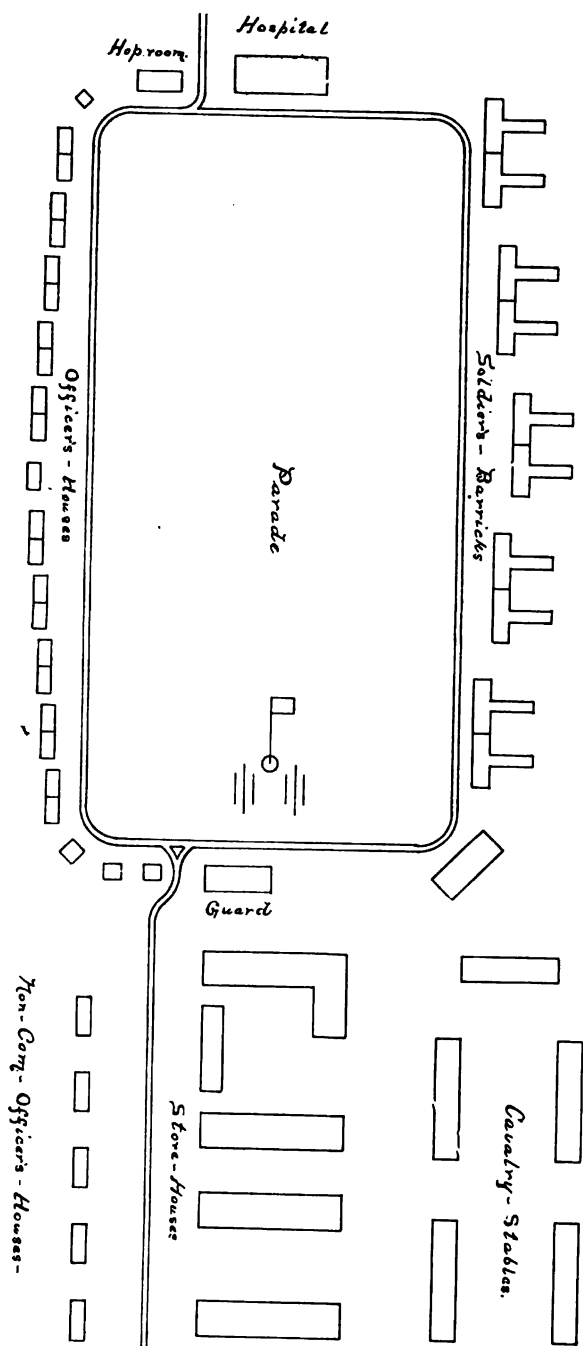


Plate IX.
203

and on the other side ten sets of barracks for soldiers, which are also double buildings ; at one end are the hospital and chapel, and at the other end the band quarters, guard house, officers' mess house and club-house, and adjutant's office. All these buildings face the parade, while the cavalry stables, store-houses, traders' store, civil employees' building, quartermaster's corral, riding schools and rifle ranges extend to the south for about a mile further. Most of the

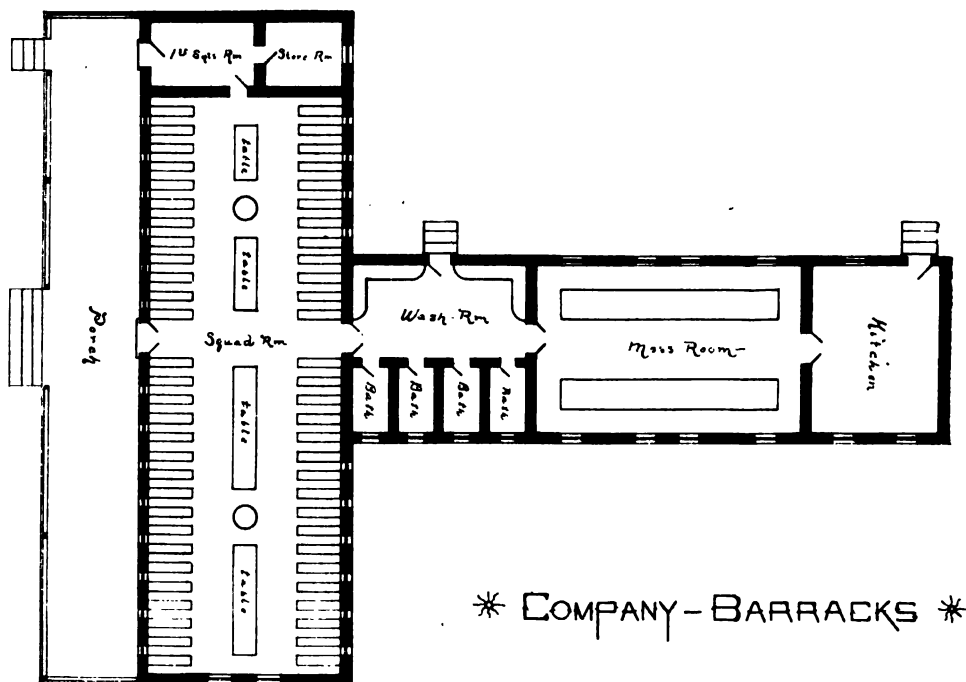


Plate X.

buildings are of wood, though some of the later ones are of brick. The men's barracks are one-story. Each has a broad porch in front for roll calls in stormy weather, from which opens a long squad-room, a hundred and fifty feet or so in length, furnished with woven wire bunks, wool mattresses and pillows, tables and chairs, lockers and lamps. Next back is a lavatory with bath rooms ; then the mess-hall and kitchen.

Plate X shows the interior of one of the company barracks.

The officers' houses are supplied by the government, but officers supply their own furnishings.

The same routine of duty is conducted in garrison as in camp. It is an arduous, medleyed service that the regular army has on the western frontier, guarding settlers and railroad construction and prosecuting Indian wars.

The men and officers of the regular army have been the pioneers of civilization in its rapid western march. The first wagon roads and telegraph lines have been built by troops in opening communications between distant posts and in following Indian trails, and the first maps of the country have been compiled at military headquarters, from the itineraries sent in by officers with their official reports.

A trip over the west will show the traveller that although the habits of Indians have been materially changed, there is work for years to come for our army in watching the 250,000 restless Indians who have lost their natural means of support—the buffalo and large game—and who had now rather steal the settlers' cattle than clear away the sage-brush and raise their own stock. They still have their "sun-dances" and troops must patrol the frontier in summer and frequently go out from their comfortable barracks and endure the hardships of winter campaigning.

The details of army life might in this connection be pertinent and interesting, but it is the purpose of this article only to outline the methods of quartering soldiers in barracks, and give a general idea of the regular soldier's service when in garrisons, awaiting the call for active campaigning in the field.

A military post is practically a camp made up of buildings instead of tents. Many of our permanent posts were first the accidental camping places of commands; then temporary shelter was put up as winter came on, and afterwards permanent buildings constructed.

The War Department has changed the designation of many of them from "camps" to "forts."

CHAPTER VII.

Guard Duty.

At every military post, and in every regiment or separate command in the field, a post or camp guard is detailed and duly mounted. It consists of such number of officers and enlisted men as the commanding officer may deem necessary. This guard is called a "police guard," or "interior guard," (See Plate V.) in contradistinction to "pickets," "outposts" and "advance guards," which will be treated in the succeeding Chapter (VIII).

The number and posts of sentinels about a regularly formed camp* are as follows: One over the arms of the guard; one at the commanding officer's tent; and as many on the front, rear and flanks as may be necessary.

When necessary *detached posts* may be established outside the chain of sentinels. The posts are under the orders of the commander of the camp guard, and are visited by his patrols.

If necessary, or expedient, the commanding officer may require that no person shall pass a sentinel's post unless passed by an officer or non-commissioned officer of the guard; he should also prescribe how and where soldiers and others shall enter or leave the post or camp.

He will determine whether the countersign shall be used or not, and if he requires its use for purposes of instruction may authorize sentinels to pass persons who have not the countersign after they have been duly recognized.

COUNTERSIGNS AND PATROLS.

A "countersign" is a word given daily from the principal headquarters of a command to aid guards and sentinels in identifying persons who may be author-

*See Camps of an Infantry Regiment, Plate V.

ized to pass at night. It is given to such persons as are entitled to pass and repass sentinel's posts during the night, and to officers, non-commissioned officers, and sentinels of the guard.

The "parole" is a word used as a check on the countersign in order to obtain more accurate identification of persons. It is imparted only to those who are entitled to inspect guards and to commanders of guards.

The parole, or countersign, or both, are sent in the form of an order to each person entitled thereto.

The "countersign" is usually the name of a battle; the "parole" that of a general or other distinguished person.

When the commander of the guard demands the parole he will receive it as a sentinel receives the countersign.

As the communications containing the parole and the countersign must at all times be distributed by many orderlies, the parole entrusted to many officers, and the countersigns besides to numerous sentinels, and both must for large commands be prepared several days in advance, there is always danger of their being lost or otherwise disclosed to persons who would make improper use of them; moreover, a sentinel is too apt to take it for granted that any person who gives the right countersign is what he represents himself to be; hence for outpost duty there is greater security in omitting the use of the countersign and parole, or using them with great caution. The chief reliance should be upon personal recognition or identification of all persons claiming authority to pass.

Persons whose sole means of identification is the countersign, or concerning whose authority to pass there is a reasonable doubt, should not be allowed to pass without the authority of the corporal of the guard after proper investigation; the corporal will take to his next superior any case that he himself is not competent to decide.

GUARD PATROLS.

A guard patrol is a small detachment of two or more men detailed to observe and procure information of the enemy, or for the performance of some special

service connected with guard duty. Patrols are usually detailed from the guard and receive instructions from its commander.

If the patrol be required to go beyond the chain of sentinels, the officer or non-commissioned officer in command will be furnished with the countersign, and the outposts and sentinels warned.

If challenged by a sentinel, the patrol is halted by its commander, and the non-commissioned officer accompanying it advances alone and gives the countersign.

ROSTERS.

A roster is a list of officers or men for duty, with a record of the duty performed by each. Generally details for duty are made so that the one longest off is the first for detail. Details so made are said to be made *by roster*.

All details for service in garrison and in the field shall be made by roster ; but officers or enlisted men, when detailed, must serve whether a roster be kept or not ; having performed the service, they may appeal to superior authority if they deem themselves aggrieved.

The duties performed by roster are two classes : The first class comprising —1st, outposts ; 2d, interior guards, including stable guards ; 3d, detachments to protect laborers or military works ; 4th, armed working parties on such works. The second class comprises all other duties and fatigues, in or out of the garrison camp.

The following are the usual rosters relative to "interior guard" duty :

1. Officers of the day.
2. Officers of the guard.
3. Sergeants of the guard.
4. Corporals of the guard.
5. Musicians of the guard.
6. Privates of the guard.

The first two are kept by the adjutant ; the third, fourth, and fifth by the sergeant major, under the supervision of the adjutant, or by the first sergeant of

companies, as directed by the commanding officer ; the sixth is always kept by the first sergeants. Captains supervise the keeping of company rosters by their first sergeants, and see that all duties performed by members of the company are duly credited.

Captains serve on the first roster, lieutenants serve on the second roster, and may also be placed on the first roster, at the discretion of the commanding officer.

An officer of the day will be detailed for duty with each guard, and where more than one guard is required in a command a field officer of the day will also be detailed. The field officer of the day receives his orders from the brigade or division commander, as directed by the latter. Captains may, when necessary, be placed on the roster for field officer of the day.

The detail of officers of the guard will be limited to the necessities of the service and efficient instruction ; inexperienced officers may be detailed as supernumerary officers of the guard for purposes of instruction.

Officers serving in staff departments are, at the discretion of the commanding officer, exempt from guard duty.

It is customary to detail for guard within a regiment or large camp one "officer of the guard" and one "supernumerary officer of the guard."

The details for officers of the day and guard are published at the parade next preceding the announcement of their tour. They are also personally notified on the day before their tour, by a written order, when practicable.

Post and camp guards will be relieved every twenty-four hours.

The men for post or camp guard are usually taken from all the companies, from each in proportion to its strength.

In the field, when the commanding officer deems it advisable, a company may be detailed to form the guard, the captain being the officer of the day, and the lieutenants, officers of the guard. The company is inspected on its own parade by its captain, and marched to the post of the guard by the senior lieutenant.

At "first sergeant's call" which in camp or garrison sounds about noon, the first sergeants repair to head quarters for the details, etc., which are usually posted on a bulletin board at the sergeant major's office or tent, in form as follows:

Co.	Duty.	Sergeants.	Corporals.	Musicians.	Privates.	Proportion.
A	36	Aaron Brown.	B. C. Jones.	2	+19
B	32	E. L. Burr.	3	+30
C	42	L. R. Scott.	3	—31
D	40	&c., &c.	H. P. Carr.	3	+20
	166	1	3	1	10	

CHAS. YOUNG,
Sergeant-Major.

The following shows the method of keeping the first sergeant's roster :

[illegible]

The names are entered in the left hand column ; the numbers at the top indicate the days of the month, and the following are the characters and abbreviations used in keeping the roster :

A— Absent without leave.

Ar— In arrest.

C— In confinement.

D— Return to duty. (To be used only in case of men not detailable for guard duty.)

D. S. Detached service.

E. D. Extra duty.

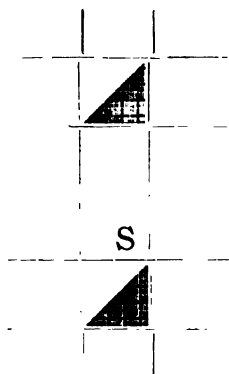
Fur— On furlough.

Pass— On pass.

Rec— Recruit.

S. D.-- Special duty.

Sk— Sick.



On ordinary guard, if any special guard such as stable is to be indicated the initial letter may be placed in the open half space, e. g.

1, 2, 3, etc.—Numerals to indicate days off or “nights in bed.”

Other rosters are kept in a similar manner.

SUPERNUMERARIES.

One “supernumerary” from each company will be detailed and attend guard mounting. If any private of the company detail is considered by the adjutant at guard mounting to be unfit to go on guard he is replaced by the supernumerary

from the same company, and should the adjutant be notified that men are required to fill vacancies in the guard after guard mounting, he will cause the proper number of supernumeraries to report to the commander of the guard, taking them from those companies that have furnished less than their proportionate part of the guard. A supernumerary who thus goes on guard will be credited on the company roster with a tour of guard the same as though he had been detailed as a private of the guard.

GUARD MOUNTING.

The tactical ceremony for guard-mounting is given in the drill regulations for each "arm," and the duties of officers and sentinels are prescribed in detail in a "Manual of Guard Duty" published by the U. S. War Department which must be studied and recited upon by classes or squads under the supervision of a competent instructor before men go on guard, and recruits should not be detailed for guard until they have had such a course of instruction.

The manner in which sentinels of the guard do this duty is a fair index of the discipline of the command. Every officer, therefore, assisted by the officers and non-commissioned officers under him, should take the greatest interest in bringing his men to the highest standard of guard duty. The sentinels and pickets are the guardians of an army, and its welfare and success are in no small measure dependent upon their vigilance and their ability to know and perform their duties.

CHAPTER VIII.

Advance Guards and Outposts.

It is one of the maxims of war that "surprise is never pardonable in a commander" and to guard against surprise, as well as to gain the information necessary to a commander, relating to the geography and topography of the country and the strength and movements of the enemy, covering detachments are made use of. On the march, these are called *advance guards*, *rear guards* and *flankers*; when troops are at a halt, they are called *outposts*.

The general disposition and duties of all these covering detachments are similar, but they will, herein, be treated separately. *Reconnaissance* and *screening duty* will also be touched upon briefly in this chapter as being a part of its general subject.

THE ADVANCE GUARD.

A column of troops, *on the march*, is divided into a *main body*, *advance guard* and *rear guard*, and such flanking parties as appear necessary. (See Plates I and II.)

The drill regulations give the commands necessary for deploying small advance guards, and consequently these commands will not be repeated here, as the student is supposed to be conversant with drill regulations before studying this book.

The strength of an advance guard varies with the size of the main body, the topography of the country and the nature of service, from one-fourth to one-twentieth of the whole command.—e. g. One company might be the advance guard to a battalion; two companies to a regiment; one or two battalions to a brigade; one brigade to a division.

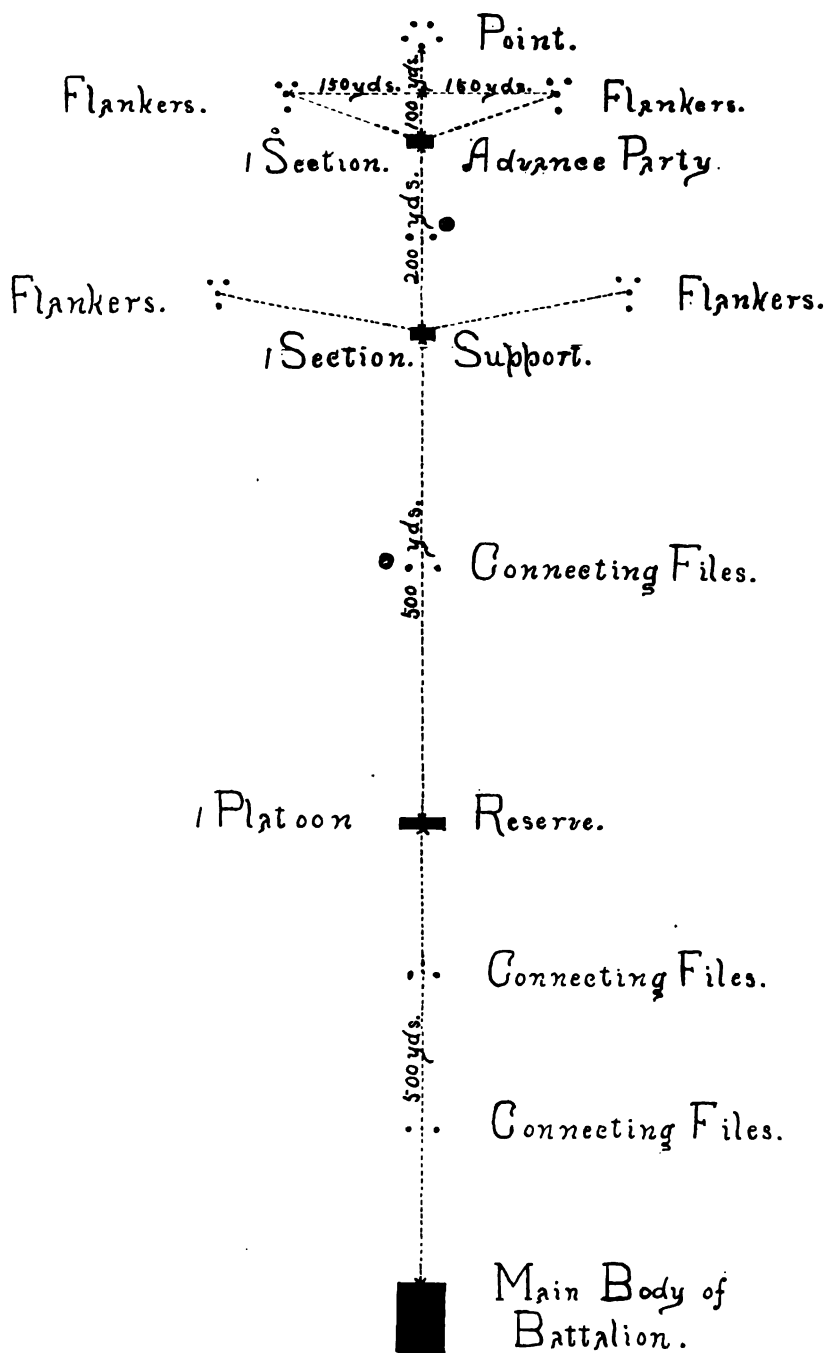


Plate XI.

An advance guard is made up of a number of detachments, increasing in strength progressively from the front to the rear. The object of each of these detachments being to guard against a surprise to the stronger body which follows immediately in its rear and give the latter time to form for attack.

The advance guard is divided into an *advance party*, a *support*, and a *reserve*. The advance party and support, taken together, are called the "van-guard." The van-guard is usually equal in strength to the reserve, and the advance party and support are usually of equal strength.

Plate XI illustrates one company of infantry (100 men) deployed as advance guard to a battalion. The advance party (one section) consists, first of a "point" — 3 or 4 men under a non-commissioned officer 100 yards to the front; on each side are flanking groups of 4 men each, about 150 yards from the main route, to the right and left rear of the point. Each flanking group is under a corporal or old soldier, and habitually marches with 2 men in front and 1 in rear of the group leader. The rest of the advance party follow 100 yards in rear of the point. The support (one section) is 200 yards in rear of the advance party and throws out flanking groups of 4 men each to its right and left front and farther out than the flankers of the advance party. A connecting file (2 men) detached from the advance party marches about half way between the advance party and the support to carry information from one to the other.

The reserve marches about 500 yards in rear of the support, a connecting file marching between them. The reserve may throw out flanking groups, these groups being slightly farther out than those of the support. The main body follows about 500 yards in rear of the reserve, one or two connecting files marching between the two bodies.

When the strength of the company is less than 100 men the distances and strength of detachments is correspondingly reduced, and the nature of the country may necessitate dispensing with flankers, but there should always be a "point" of at least three men.

When the country is open the entire advance party may be deployed as skirmishers with extended intervals, and the support follow in "line of squads." (See Plate XII.)

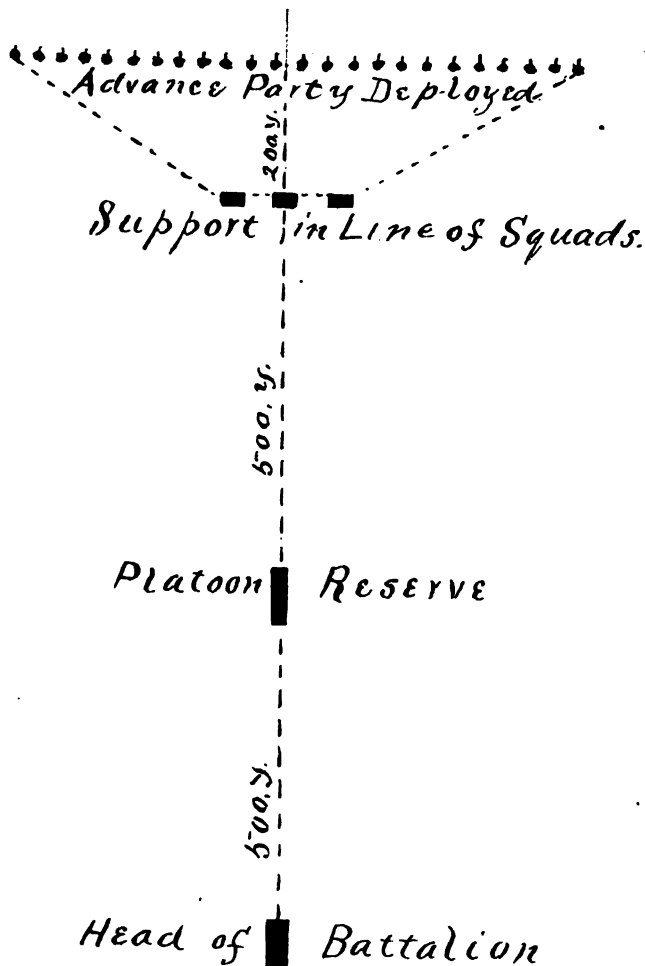


Plate XII.

The reserve ordinarily moves in column. A battalion of four companies deployed as advance guard would usually be distributed as follows: One company as advance party, one company as support and two companies as reserve.

While the distances between detachments vary according to the circumstances of service, the advance guard, as a whole, should always be far enough ahead to enable the commander of the main body to make his plan of action while the advance guard is resisting the enemy. As a general rule, the distance from the "point" to the head of the main body should be equal to the depth of the main column, as the time required for the rear troops to move up and form for battle on the head of the main column would be about the same as that taken by the advance guard in falling back upon the main body, if such a movement became necessary. In Plate II, the dotted lines outline such a formation at the head of the main column of a division. It should, however, be borne in mind that when practicable "the line of resistance" that is, the "fighting line" should be formed somewhere in front of the "reserve" of the advance guard,—near the support if the nature of the country there is favorable. The reserve is really the first body that demands time for deployment. It is essentially the fighting part of the advance guard. The "vanguard" is the reconnoitering part.

The commander of the advance guard habitually marches with the reserve. The commander of the vanguard should habitually be with the support, although he goes to any part of the vanguard where his presence is necessary. He should have a map of the country; and should see that the proper road is taken by the "point"; that men are left at the cross roads to guide the main column; that patrols are sent out to examine ground that might afford shelter for the enemy,—such as farm buildings, woods and small settlements; that the necessary repairs to roads and bridges are made. And he should promptly transmit all reliable information that may have been gained about the enemy back to the commander of the advance guard.

When the command is large, a staff officer accompanies the vanguard to select camps or bivouacs for the main body, and when he has selected the place he remains there until the arrival of the main body, the advance guard moving on and forming the temporary outpost.

When the advance guard is halted all approaches should be guarded and an officer sent to some high point available for an extended view.

Advance guards pay no compliments. Information should, as far as practicable, be conveyed by a code of signals, and loud shouting avoided. The "point" and "flankers" should only fire when they have been seen by the enemy and are sure the enemy is not retiring.

CAVALRY ADVANCE GUARD.

The formation for a cavalry advance guard is similar to that for infantry, but the distances between detachments is greater, because cavalry can move faster than infantry. Plate XIII shows a troop of cavalry deployed as advance guard.

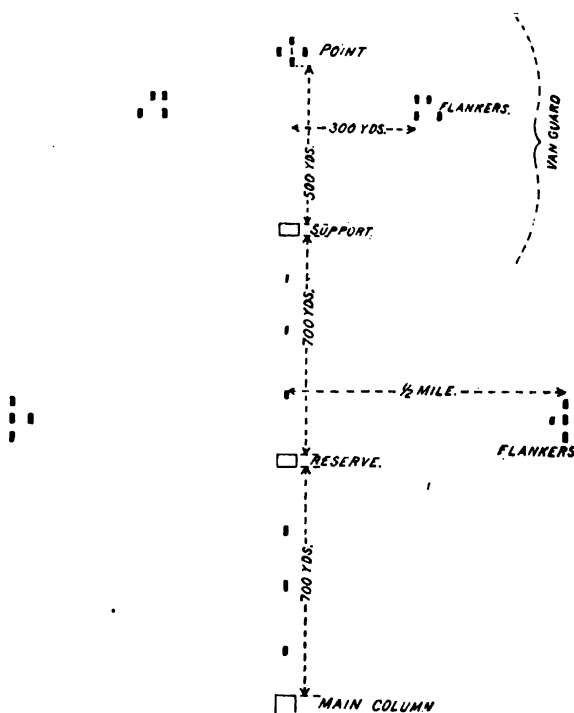


Plate XIII.

advance party. The point may consist of two troopers, while two troopers march in rear of or near the sergeant. The flankers each have four troopers and are

If the troop be divided into two platoons the first platoon constitutes the vanguard and the second, the reserve; if there be three platoons, the first and second form the reserve; if there be four platoons the first and second form the vanguard and the third and fourth the reserve.

The advance party consists of the "point" and "flankers" and is commanded by a sergeant who generally marches about 100 yards in rear of the point, and on line with the flankers, although he is at liberty to go where he can best command the whole

from 300 to 500 yards from the line of march. The support follows about 500 yards in rear of the point, and sends out flanking groups of from four to eight troopers each, on each flank about one-half mile from the column, and slightly in advance of the reserve.

The reserve follows about 700 yards in rear of the support. The main body follows about 700 yards in rear of the reserve.

Connecting files are employed along the column when the road is winding, rough or wooded, but are not so necessary as for an infantry advance guard, because mounted men can move quickly from one group to another.

Two troops, as advance guard, would have one troop as "vanguard" and the other as "reserve."

ADVANCE GUARD OF A DIVISION.

Plate II illustrates the march of a *division, of the normal size, with one squadron of cavalry, one company of engineers and a signal detachment added for independent service.

The advance party of the advance guard consists of 1 troop of cavalry, the "point" being $\frac{1}{4}$ mile in front, and flanking patrols, of a platoon each, from 2 to 3 miles on each flank of the main part of advance party.

The support consists of $2\frac{1}{2}$ troops of cavalry; 2 battalions of infantry; 1 section engineers with a tool wagon; 2 machine guns; detachments and ammunition carts enough so that each soldier may have 200 rounds of ammunition,—including what he carries in his belt,—and the two machine guns a sufficient supply for an emergency.

About one mile intervenes between the advance party and the support.

Flanking detachments furnished from the support, march nearly opposite the reserve and farther out than the flankers to the advance party.

The reserve is about $1\frac{1}{4}$ miles in rear of the support. The commander of the advance guard marches at the head of the reserve, with one platoon of cav-

* See page 15.

alry as his escort. Then follow 1 battalion of infantry, 1 battery of artillery, 1 regiment of infantry, 1 section of engineers, infantry ammunition carts and 1 platoon of hospital troops with ambulance. Two more wagons loaded with axes, shovels and picks, should also be with the reserve. The distance from the reserve to the main body varies from 1 to 3 miles.

A careful scrutiny of Plate II will show the disposition of the troops in the main column, with the major-general commanding at its head, with his staff and a platoon of cavalry as his escort.

THE REAR GUARD.

A column on the march in an enemy's country should always be followed by a "rear guard." Its formation is that of the advance guard reversed, with more flankers. (See Plate II.) Nearest the main body is the "reserve" after which follow the "support" and the "rear party;" the extreme rear of the latter being composed of a "point." Flankers are thrown out similarly to those for the advance guard. A troop of cavalry as rear guard, has the same formation except that the distances between detachments are greater than for the infantry.

The rear guard of an army advancing on an enemy, as a rule, need not be stronger than one-twentieth of the entire force. If an enemy is in pursuit the rear guard is frequently increased to one-fifth of the entire command. It is in retreat that the rear guard performs its most important functions, in covering the movements of the main body, as well as delaying the enemy in every possible way.

In a forward movement, the provost marshal and provost guard march with the rear guard, which takes charge of all persons arrested by them.

The rear guard should collect all stragglers and require them to move on, and it should not allow the sick or wounded to be left behind unless they are provided for. There should be with the rear guard, transportation for the sick and wounded and when there is not transportation enough to carry the sick and wounded along, they should be formally transferred to the authorities of some village or town and medical officers and medical supplies left with them.

FLANK PATROLS.

These detachments turn their attention to everything which may disclose the movements of troops. They should examine, carefully, every place where the enemy might be concealed, such as farm-houses, villages, woods and ravines, and soldiers by twos, should be sent to the eminences along the route to observe. Parties met, should be examined and if suspicious they should be sent, under guard, to the reserve.

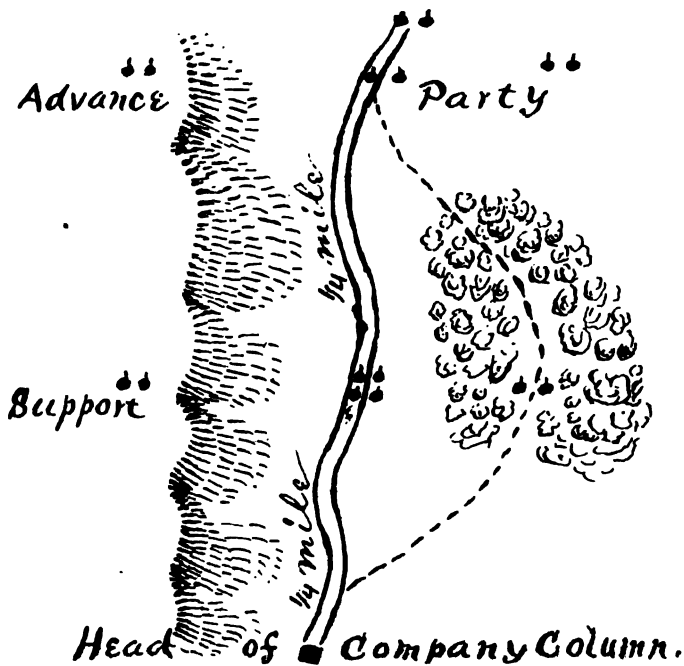


Fig. 74.

These flanking detachments themselves assume the formation of advance guards, if large, and if small, of patrols. Figure 74 shows the march of a flank patrol along a road with a high ridge on the left and a piece of woods on the right.

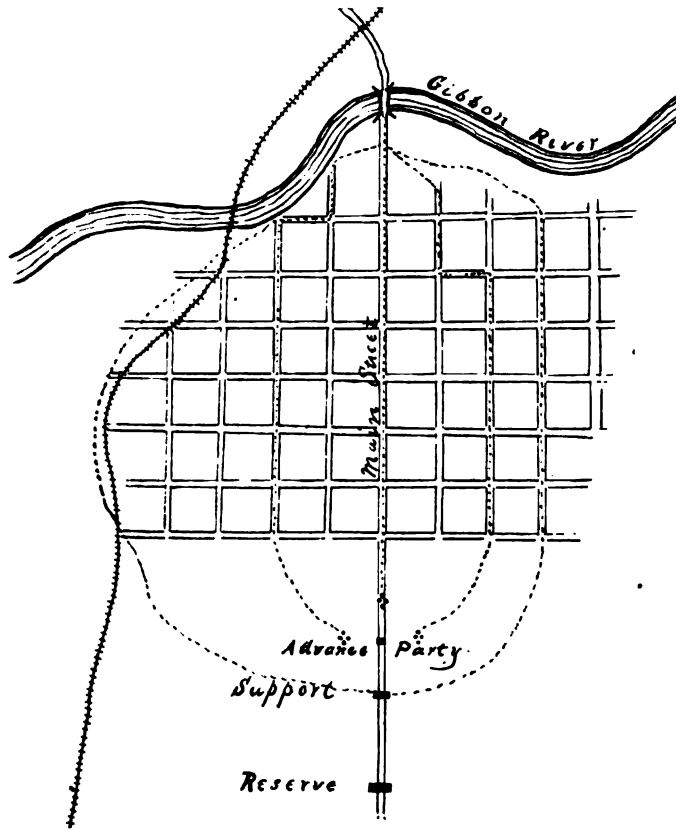


Fig. 75.

Figure 75 shows an advance guard passing through a village. When about $\frac{1}{2}$ of a mile from the village the support and reserve halt until the "advance party" reconnoiters; —the "point" going through the principal street and the flankers along the side streets. Patrols might also be sent, from the support, to move farther to the right and left, or perhaps, around the village. When signaled, or notified, that there is no enemy, the support and reserve move on through the principal street; the advance party halting after passing the village to allow the support and reserve to close up to their proper distances.

If the "advance party" discovers that the village is occupied by the enemy, it falls back upon the support, whose commander makes such dispositions as may

be necessary to force a passage. Similar precautions should be taken before passing small wood-lots, defiles, etc.

OUTPOSTS.

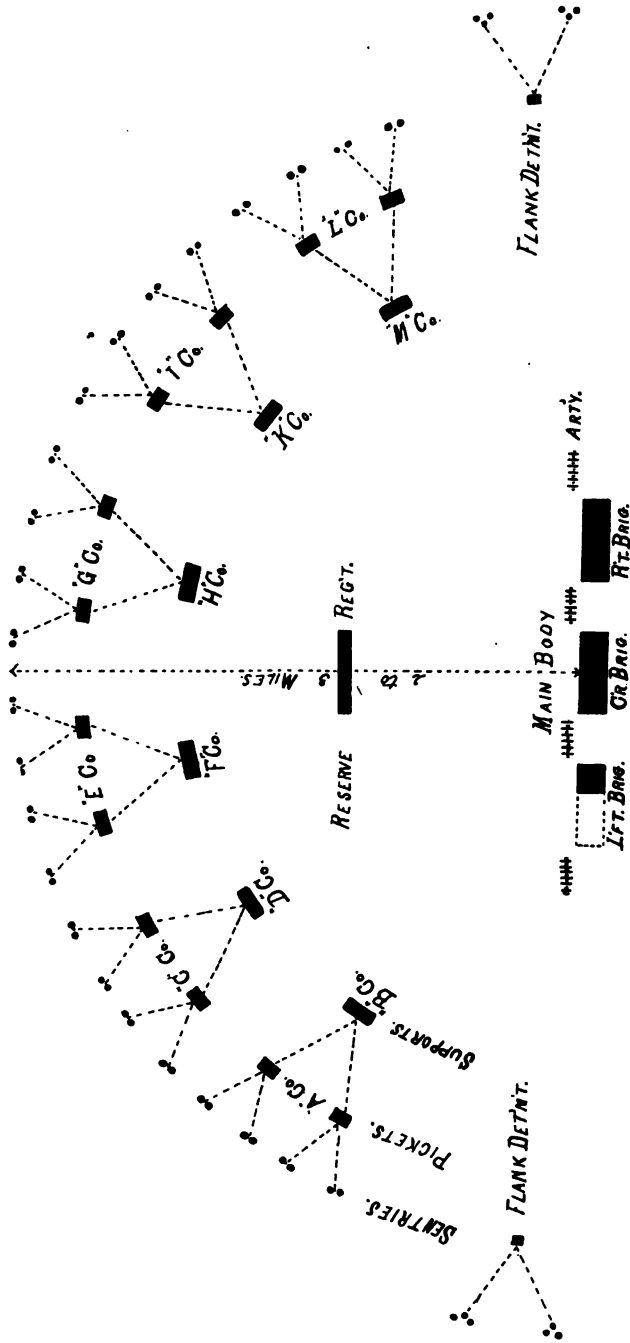
When commands are at a halt, outposts are thrown out similarly to advance guards on the march, to observe all approaches and to discover and report the movements of the enemy, and check his advance long enough to enable the main body to prepare for action.

An outpost is divided into "sentinels," "pickets," "supports" and "reserves." (See Plate XIX, which illustrates the outpost to a division.) Two regiments of infantry are taken from the left brigade to form the outpost, and a flank detachment is also thrown out from the main body to the right and left.

This is known as the *cordon* system in which the entire front is covered by a chain of sentinels. The sentinels are sent in turn from the pickets which are from 100 to 400 yards in rear of the sentinels. The supports are from 400 to 800 yards in rear of the picket and the reserve from 400 to 800 yards in rear of the supports. The line of sentinels is from two to three miles in front of the main body.

The outpost should be far enough from the main body to allow the latter time to form for action while the outlying troops are falling back. However the supports are usually placed on ground suited for the "line of resistance," that is the line most favorable for giving battle. In case the outpost is attacked the first skirmish line is usually deployed on this "line of resistance" to be "filled" in from the reserve and main body.

The geometrical figure in Plate XIV is given to show the general system, but in practice the nature of the country will necessarily modify this exact formation. Plate XV better shows the practical stationing of an outpost according to the nature of the country, A being the "reserve," B "supports," C "pickets" and D "sentinels," the main body being back two or three miles in rear. Patrols move between the various detachments of an outpost.



Divm. ■ Hdqrs.
Plate XIV.

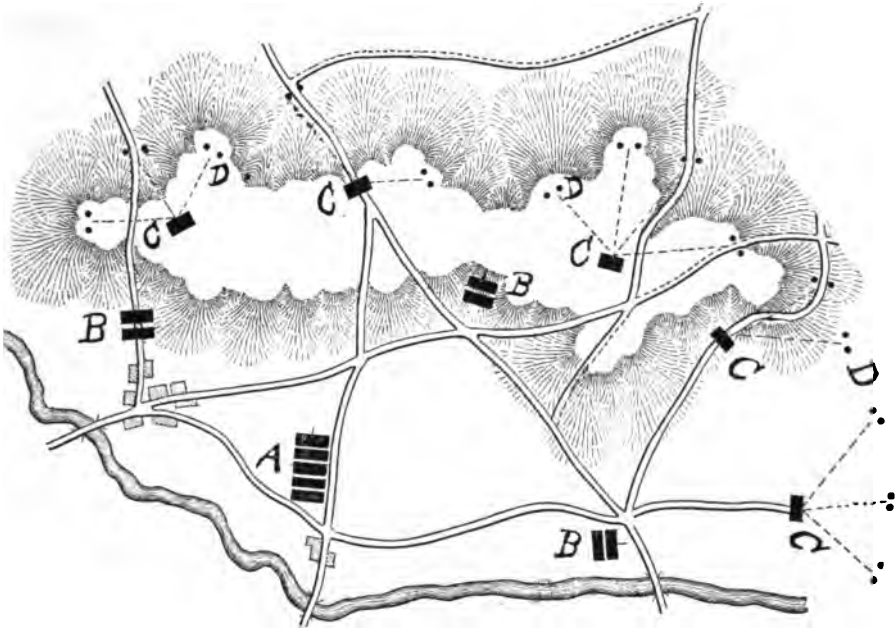


Plate XV.

The commander of the outpost receives from the commander of the main body, instructions as to the general front to be occupied, and when the outposts have been posted its commander makes his inspection and orders such changes in positions as seem advisable, and such intrenchments dug as are necessary to strengthen the position. Each picket and support should intrench when practicable.

The commander of the outposts must send to the commander of the main body all reliable information received.

Sentinels should be concealed as much as possible. In villages, woods or defiles they should be posted at the edge nearest the enemy. They do not walk their posts, but remain stationary; being usually posted by twos, so that one may go to examine any suspicious movement or carry information back to the picket while the other remains on post.

Only persons performing duty with the outpost or having authority over it, should be allowed to cross the line of sentinels, all others should be halted—not

more than one being advanced at a time and then conducted for examination back to the picket or such examining station as may be designated.

The bearer of a flag of truce, citizens, deserters and spies are halted and held in front of the line of sentinels and made to turn their backs towards the line, and word at once sent back to the commander or the picket.

Sentinels of the outpost must not have their watching disturbed by the usual requirements of military etiquette. They pay no compliments. They do not even take notice of officers coming upon their posts until addressed by them. Everything observed in regard to the enemy should be communicated to the picket. A system of signals should be arranged between sentinels and pickets, *e. g.* No enemy in sight—Rifle or saber held vertically, with hat on it; small body of enemy seen—walk around rapidly in a circle; strong body approaching—swing hat rapidly in circle about the head.

If the sentinel is satisfied that the enemy is advancing to attack he gives the alarm by firing his piece. But groundless alarm should be avoided, as this not only gives information to the enemy concerning their position, but unnecessarily disturbs the quiet of our command.

When the sentinel post is not in plain view of the picket a connecting sentinel is posted where he can see both the post and the picket and can be seen by both, to transmit signals from one to the other. A single sentinel is posted at the picket to keep a lookout on the line of sentinels and the connecting sentinels.

Sentinels should be relieved every 2 hours, or in stormy or very cold weather, every hour. They should challenge every one approaching their post between dark and broad day light as prescribed for sentinels of the "guard." Fires and lights should be forbidden. The bearer of a flag of truce should be blindfolded before being conducted back to the commander of the "outpost."

The outpost to a command should, as a rule, be relieved every two hours, and when the command marches the outpost is relieved as soon as the advance guard passes the "line of sentinels."

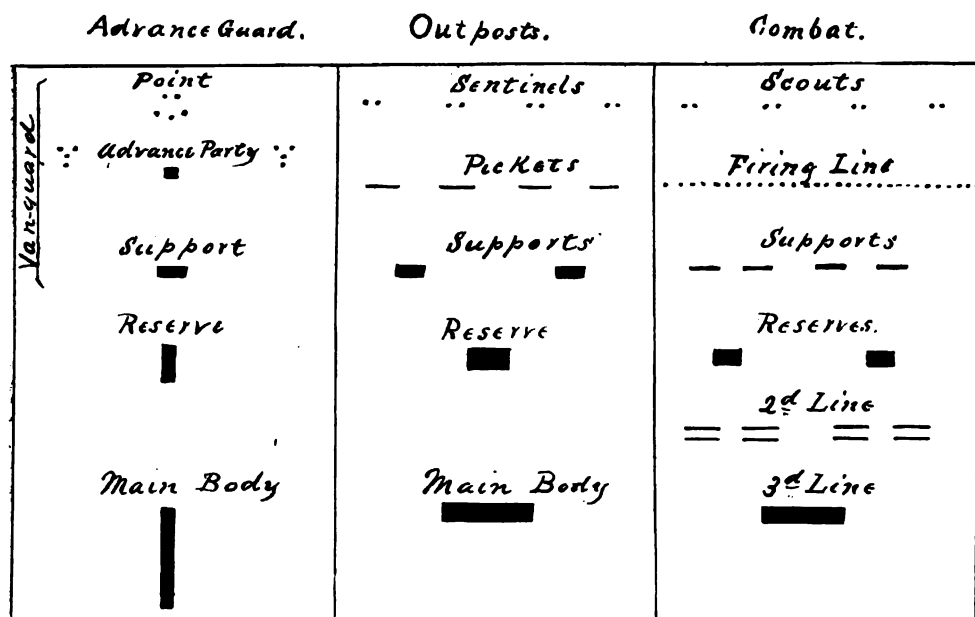


Fig. 76.

Fig. 76 shows the similarity of the formation for “advance guards” “outposts” and “combat” and suggests how the advance guard may easily be formed into an outpost, or the reverse, and how either the advance guard or outpost is deployed for combat.

COSSACK POSTS.

“Cossack posts,” of 4 men each, sent out directly from the support (see Fig. 77) have come into favor, in our service, in place of the sentinels and pickets in Plate XIV. ;—Each support furnishing from 4 to 12 “cossack posts,” which are placed from 300 to 400 yards in advance of it, and from 100 to 300 yards apart. Fig. 77 shows the “cossack posts” on the left, and the “picket and sentinel system” on the right.

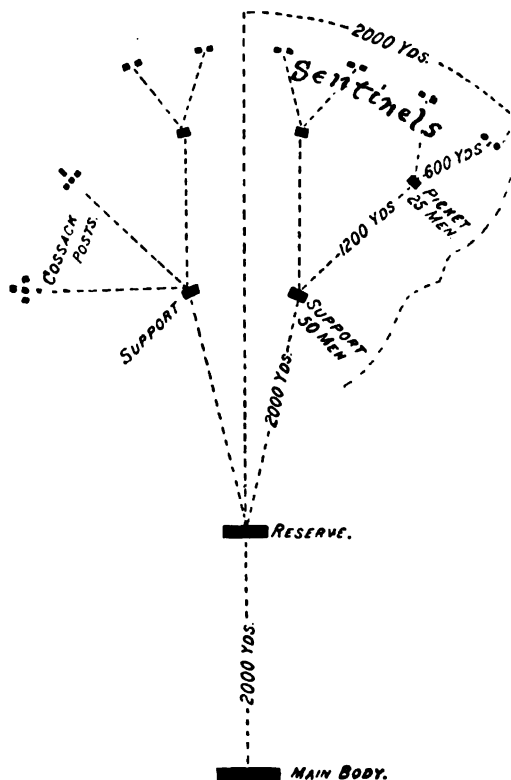


Fig. 77.

There should be one non-commissioned officer with each cossack post and one sentinel kept on watch from 10 to 30 yards in advance of the post, while the other members remain concealed. Each cossack post should be intrenched.

CAVALRY OUTPOSTS.

The general principles above enumerated, apply equally to cavalry and infantry, except that distances may be greater between detachments of cavalry. Cavalry sentinels are usually called "vedettes," and remain mounted. In mixed commands the connecting and visiting patrols are usually composed of cavalry, and when infantry serve alone there should be mounted men for this duty.

RECONNAISSANCE AND SCREENING DUTY.

Reconnaissances in force are frequently made just before an action, for the purpose of developing the strength and positions of the enemy. For a large command these forces usually consist of all three "arms." Such reconnaissances are conducted in the usual manner of attack.

Staff officers advance with the skirmishers to take notes of the enemy's strength and sketch his positions.

In these attacks, effort is made to draw the enemy's fire, as much as possible, so as to disclose his position, and different parts of his line are attacked or threatened. Cavalry and horse artillery are especially adapted to this service.

Special reconnaissances, usually by small forces, varying in size from 3 men to a battalion,—are made for the purpose of exploring the country in front of an army, as to its roads, rivers, bridges, villages, woods, defiles, heights, camping-places, &c.

The commanders of these detachments make hasty sketches and reports and send them back to headquarters of the army, or if this be not practicable verbal reports are sent by officers or intelligent men. A report, either written or verbal, is invariably made by such a commander whenever he returns.

Such patrols are also used for harrassing the enemy and capturing small outposts. They move practically as prescribed for advance guards.

Plate III gives a general idea of the reconnoitering screen between two opposing armies. Through this screen raiding and patrolling parties of both armies are kept moving, and these frequently have fights and even battles previous to the general engagement of the two armies. As screening duty is largely performed by cavalry this "screen" or "veil" in front of an army is usually spoken of as the "cavalry screen." However all arms are employed therein.

Good cavalry under enterprising leaders can not only keep the enemy's patrols from accomplishing their purposes, but can do effective work by harrassing his flankers and rear, and "raids" are frequently made with good results clear round the enemy.

The subject of this chapter—one of the most important in modern warfare—has been treated here only in an elementary manner, and every “line officer” should study in detail Wagner’s “Security and Information” which is the authorized army manual upon this subject.

CHAPTER IX.

Military Engineering.

Fortifications are generally treated under two classes, viz :

- (1) *Permanent fortifications* and
- (2) *Temporary or field fortifications.*

Permanent fortifications are those works usually constructed in times of peace, for the purpose of strengthening positions which may be of military importance in case of war; like the fortifications on the sea coast. They are usually built with great care and of durable material.

These have been outlined, sufficiently for the purposes of this book under the heading **“Corps of Engineers”* in Chapter III.

The † organization and duties of engineer troops, their proportions in divisions and corps and their ‡ positions in the column of march, have also been given in previous chapters.

Field fortifications comprise those usually thrown up by engineer and other troops, after war is declared, to strengthen positions which have suddenly acquired a military importance. As troops are said to be “in the field” at this time, these fortifications are usually known as *field fortifications*.

Although engineer troops are attached to the larger units of an army (divisions, corps, etc.,) as pioneers, sappers, miners, pontoniers, railway and bridge builders, etc., troops of all arms of the service are, at times, employed in carrying out the difficult operations of military engineering, and the modern rifle has so increased the value of cover, both in attack and defense, that some knowledge of this subject is necessary to every line officer.

*Page 95.

†Pages 14 and 15.

‡Plate II.

Field guns are usually used at a range of about $1\frac{1}{2}$ miles, though their maximum range may be considered as some more than 4 miles.

Earth-works must have a thickness of from 10 to 13 feet to be considered proof against field artillery.

Masonry 40 inches thick may be counted upon to resist field artillery projectiles for a short time.

The United States infantry magazine rifle (Krag-Jorgenson) is sighted for 1900 yards, (a little over one mile) and has a maximum range of a little over two miles.

The following thicknesses of materials may be considered proof against small-arm projectiles: Masonry, 20 inches; loose sand, 30 inches; loose earth, 60 inches; packed snow, 72 inches; soft wood, 40 inches; oak, 24 inches.

FIELD FORTIFICATIONS.

Field fortifications may be classed as follows: (1) *hasty intrenchments*; (2) *field-works*; (3) *siege-works*.

HASTY INTRENCHMENTS.

This name is applied to all extemporized shelters which are quickly constructed from materials found upon the spot.

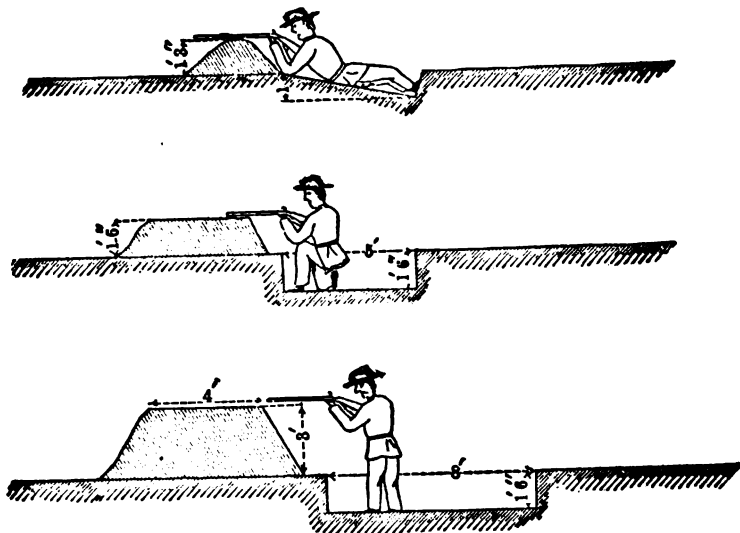


Fig. 78.

Fig. 78 shows the hasty cover for the soldier while firing “lying,” “kneeling,” and “standing,” usually called **“rifle pits.”* The student can easily see from

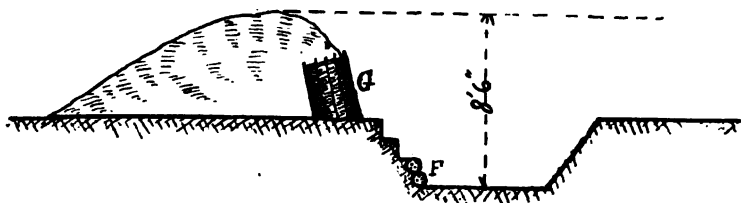


Fig. 79.

Fig. 78, how by deepening and widening the first hasty cover for the soldier lying down, it grows into the flying trench, see Fig 79, and finally into the more elaborate field-work, see pages 80 and 81.

FIELD-WORKS.

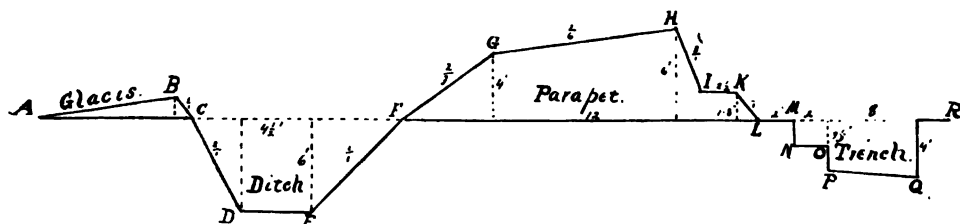


Fig. 80.

Fig. 80 shows what is known as the “nominal profile” for a field work. The dirt from the trench and from the ditch makes the parapet and the glacis. The principal lines cut by a vertical plane have the following names A, F, L, R, the site (usually the natural surface of the ground) A B the glacis, C D the counter-scarp, E F the scarp, F G the exterior slope, G H the superior slope, H I the interior slope, I K the banquette tread (on which the soldier stands to fire over the parapet); K L the banquette slope. The highest point H, of the superior slope, is called the “crest.”

*See also Fig. 3, page 23.

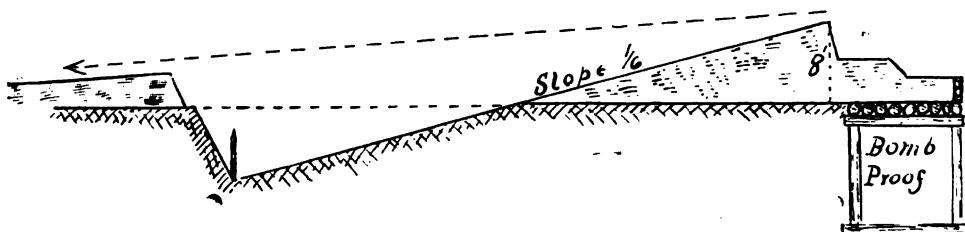


Fig. 81.

Fig. 81 shows another and more modern form of field-works.

When it becomes necessary to sustain the earth, various materials are used for revetments such as "fascines" and "gabions," shown at G and F, Fig. 79, and sods, logs, sand-bags, timbers, stones, etc.

A fascine is simply a bundle of rods or brush-wood, tightly bound together. These are usually about 18 feet long and 9 inches in diameter.

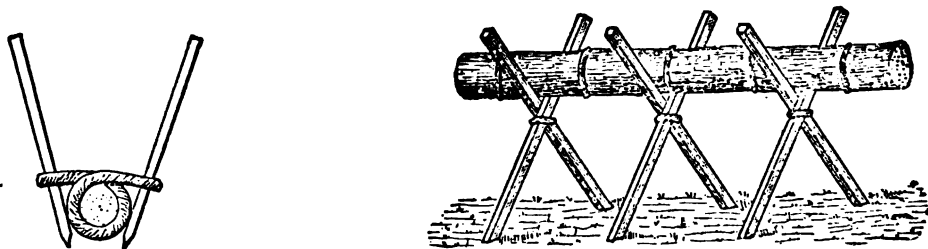


Fig. 82.

For the manner of making fascines see Fig. 82; the picture on the left shows the "fascine-choke" used to compress the bundle of rods or withes together for tying. The fascines may be tied with withes, wire or strong twine.

The gabion, see G Fig. 79, is made by driving pickets into the ground in a circle and wattling twigs around the pickets. Gabions are usually made 2 feet 9 inches high and 2 feet interior diameter. For use as "revetment" the gabions are filled with earth.

Sand-bag revetment has advantages when speedy shelter is required or when the earth has to be carried some distance under fire. They do not, however, last

long as the bags soon rot or become punctured so as to allow the sand or dirt to run out. Sand-bags are very useful to place on the parapet of a work to form loop-holes for the defense. See Fig. 83.



Fig. 83.

Timber when abundant, would be used in preference to any other material for revetment. But when timber is scarce its better use is for "bomb-proofs" see Fig. 81 which serve for protection against both weather and hostile fire.

The interior slope of a field work, for infantry, is made steep, see Figures 80 and 81, so that the soldier may lean against it and be covered as much as possible while firing.

The exterior slope is arranged so as not to obstruct the field of view and terminates in a ditch having a palisade of sharpened stakes, wire entanglements and other forms of obstruction.

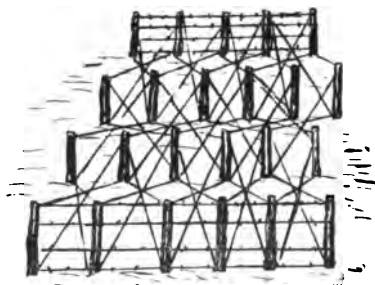


Fig. 84.

The ground in front of the ditch is also covered with wire entanglements (see Fig. 84) made by driving stakes in the ground about seven feet apart in three or more rows, arranged checkerwise, and stretching wire upon them in different directions.



Fig. 85.

Abatis, see Fig. 85, are much used as obstructions in front of field works, particularly in a wooded country. These are made by felling trees, towards the enemy, sharpening the branches and driving stakes to fasten them in place.

Chevaux-de-fris, see Fig. 86, are used as obstacles to cavalry.

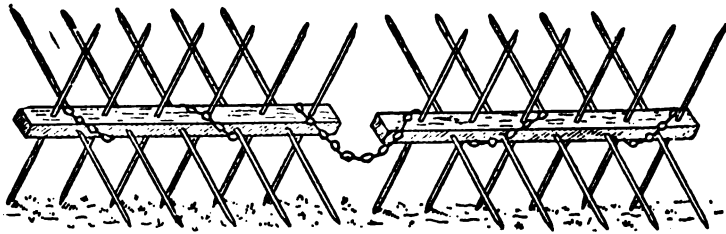


Fig. 86.

Military Pits, (French *trous-de-loup*) see Fig. 87, are frequently made in front of works, also various forms of military mines which explode when trod upon.

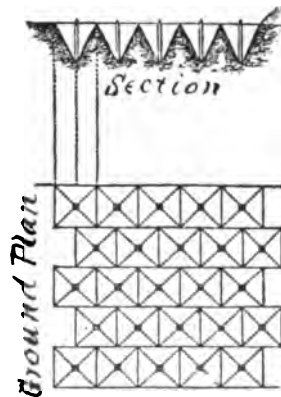


Fig. 87.

On account of the extensive use of barbed-wire fences over the country where troops have to march and the wire-entanglements in front of field works, it has become necessary for several soldiers of each squad to carry wire-cutters. See Fig. 88.



Fig. 88.

TRACE.

The term *trace* is used to denote the general outline upon the ground of a field fortification, or line of works. The governing, or principal line, used in constructing the trace, is the projection upon the *plane of site* of the line from which the fire is delivered, viz.: the "interior crest" shown in Fig. 80 at the point H.

In order to have a direct fire upon the ground exterior to the parapet the interior crest of a field-work should be perpendicular to the direction in which the fire is to be thrown, and as there may be several directions in which fire is necessary to meet that of the enemy, the trace must usually be a broken line.

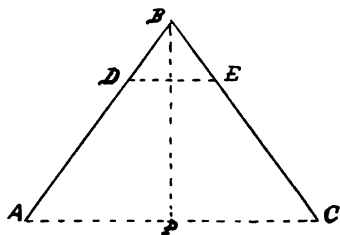


Fig. 89.

One of the simplest forms for a field-work is the *redan*, see Fig. 89. This consists of two straight lines forming an angle $A B C$, the vertex of the angle being towards the enemy. The sides or *faces*, $A B$ and $B C$, are usually from thirty to sixty yards long.

It will be readily observed that these two lines of parapet, A B and B C, give no direct fire to the front. Front fire, may, however, be obtained by stopping these "faces" at D and E and connecting these points by a straight parapet, making what is known as the *blunted-redan*.

A D E C. By adding two lines of parapet D A and C E, Fig. 90, to the redan A B C we have what is called a *lunette*.

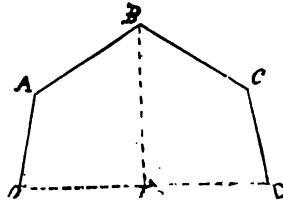


Fig. 90.

If two lunettes A and B, Fig. 91, be connected by a straight line of parapet C D the resulting construction constitutes what is known as a *bastion-trace* and the position E G C D H F is known as a *bastion-front*.

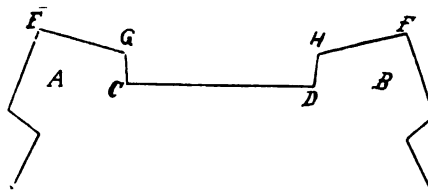


Fig. 91.

By constructing a bastion-front on each of the four sides of a square, we have what is called a *bastion-fort*, see Fig. 92.

To construct the *trace* of such a fort, let A B be one of the sides of the square which is to constitute the site. Bisect this side, and at its middle point erect a perpendicular P C: lay off the distance C P equal to $\frac{1}{8}$ of A B. Join the point P with each of the points A and B. Lay off the distances A F and G B each equal to $\frac{2}{7}$ of A B. Draw F D—the angle F D B to be between 90° and 110° . Draw the line G E in a similar way. Connect the points D and E.

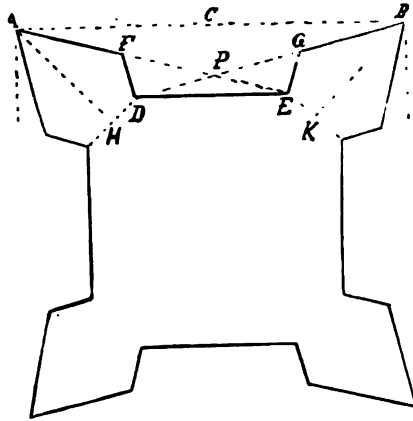


Fig. 92.

The line A F D E G B is the trace of the bastion-front constructed upon the side A B. Construct the other fronts in the same way.

The six and eight pointed *star forts* are sometimes better adapted to the nature of the country, but as a rule the *bastion trace* is used in some modified form. By a careful study of Fig. 92 it will be observed how completely the ground about this fort is swept by direct fire from its line of parapet.

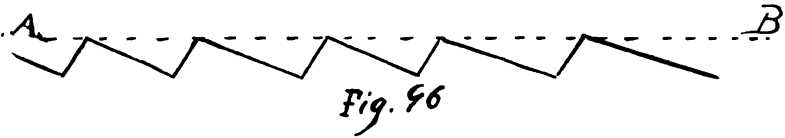
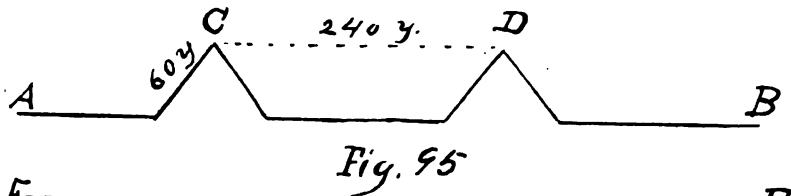
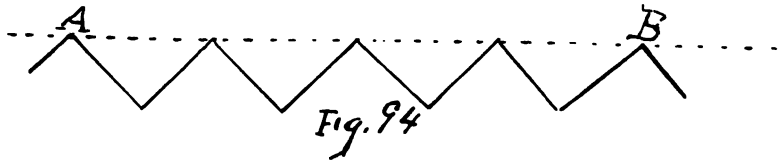
LINE OF WORKS.

The term field work in its strict technical sense is applied to a single temporary fortification used to strengthen a position of limited extent, and in which the troops are dependent upon themselves. The term *line of works* is applied when several field works are used in conjunction as a chain of fortifications to strengthen a position of considerable extent, defended by an army or a large body of troops.

A line of works may be *continuous* or *with intervals*.

Continuous lines have the entire front to be defended covered by a continuous line of parapet, leaving no openings except those necessary to the defense.

The principal types of continuous lines are the *straight line*, the *tenaille line*, see Fig. 94, the *redan line*, two forms of which are shown in Fig. 95, the *indented line*, see Fig. 96, and the *bastion line*, see Fig. 97.



Lines with intervals, as the name implies, have intervals along the front of the position, which intervals present no obstruction to an enemy passing through them, except natural obstacles and the fire from the defender's works. These are more easily adapted to the natural features of the ground than continuous lines, and for the same extent of front require fewer men to defend them, and less labor to construct them. Fig. 98 shows a line of *lunettes*, 300 yards apart, on the straight line A B.

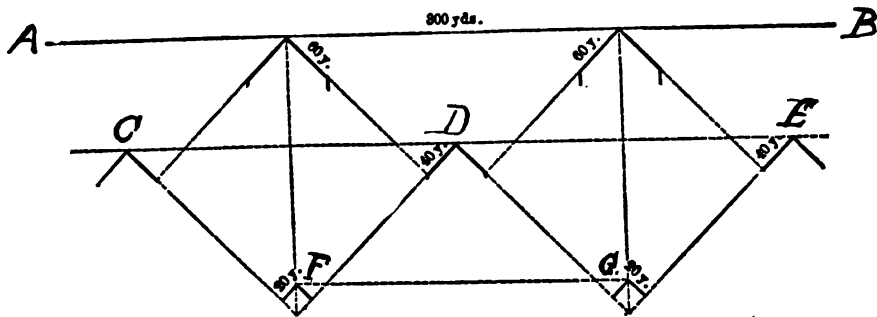


Fig. 98.

A second line may be useful, behind the first, a distance from $\frac{1}{4}$ to $\frac{1}{2}$ the interval between the first, as shown at C, D and E. But these should be so placed that direct fire from their parapets will not strike the defenders of the first line.

A third line may be useful to cover "*reserves*," as at F and G.

The accidents of the ground must naturally influence the selection of the "trace". In a broken or hilly country the heights would naturally be selected for fortifications, as these possess the advantage of overlooking the low ground in front, and also the advantage of concealing from the enemy the movements of

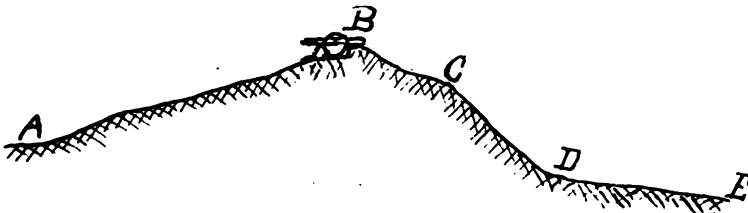


Fig. 99.

our own troops in rear, e. g. A B C D E. Fig. 99 being assumed as the profile of a hill to be fortified against an enemy to the right, Infantry trenches would best be placed at the point C—at what is known as the *military crest*,—so that the fire from the rifles in the trench would sweep the steep descent C D just in front, as well as the gentle slope D E beyond. The artillery might, however, be placed at the highest point B, as artillery requires a more extended field of view.

BOMB-PROOFS, CASEMATES AND BLOCK-HOUSES.

Within a field-work protections against hostile fire, as well as the weather, are provided for troops. See *bomb-proof*, Fig. 81, and the *casemate in the side-hill*, Fig. 100.

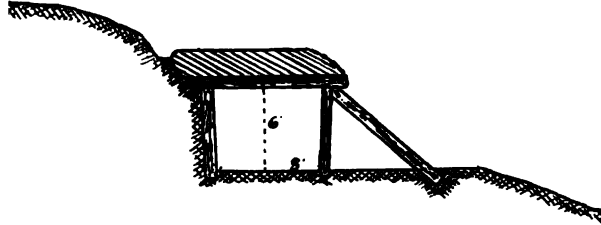


Fig. 100.

Other similar covers are constructed on level ground. These shelters consist of timbered chambers sufficiently strong to sustain the necessary earth covering and an embankment in front sufficient to withstand direct artillery fire. Sixteen inches of earth may suffice to cover a casemate when required to resist only the dropping fire of small arms and fragments from bursting shrapnel, but for proof against the vertical fire of mortars the roof should have six feet of earth, and correspondingly strong timbers to sustain it.

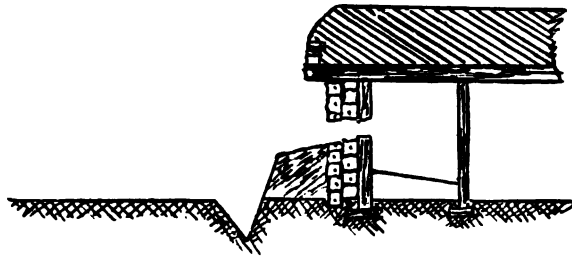


Fig. 101.

Block-houses, for infantry, are used for flanking defenses where fire cannot reach into the ditch. Fig. 101 shows a block-house made of timbers and covered with earth, but it must be remembered that, for proof against modern rifles, a

wooden wall must be forty inches thick if made of soft wood, and twenty-four inches thick if made of "standard oak." The wall of a block-house should be masked with earth up to near the loop-holes, and a ditch dug around the building. Its dimensions should be sufficient to allow sleeping accommodations for the men who are to defend it.

In isolated and commanding positions, particularly in a wooded country where artillery is not feared, two story block-houses are used, see Fig. 102; the



Fig. 102.

upper story being placed so as to have its sides make an angle with the lower story. By this arrangement the corners of the upper story project over the middle of the lower story to allow firing down through the floor near the corners of the upper story, upon ground near the building, and also give *direct fire* in all directions from the loop-holes. The plan may be a square, as in Fig. 102, or it may be six-sided or eight-sided. The one shown in the figure has no ditch around it. It is usual, however, to put a ditch entirely around such a block-

house and throw the dirt taken from the ditch up nearly to the loop-holes of the lower story.

SIEGE-WORKS.

When an attack upon a fortified place is made by a quick, sudden effort to overpower the defenders it is known as an *assault*, but when the defenders are too strong in their position and surrounded by too many formidable obstacles to warrant an assault, the attacking force must move forward by gradual approaches, making cover for themselves as they move and removing the obstacles in their way, until a favorable place is reached for making an assault. This latter operation is termed a *siege*, and the works necessary to its accomplishment are known as *siege-works*.

The first operation in a siege is to cut the communications to the place besieged and prevent its defenders from receiving reinforcements or supplies. This is called the *investment of the position* and is accomplished by strong detachments of troops from the attacking force quickly and suddenly surrounding the position, seizing all avenues of approach and establishing a chain of outposts and sentinels just outside the range of fire of the defense, but close enough to watch all their movements. This chain is drawn in near the position by night and moved back by day—called in the former case a *night cordon*, and in the latter, a *day cordon*. Then it is decided whether to institute a *blockade*, which consists in keeping the position surrounded and preventing supplies from reaching the defense until, driven by want, they are obliged to surrender; or a *bombardment*, which consists in directing a heavy fire of shot and shell upon the place, to destroy magazines and supplies and “wear out” the defense; or to approach the position by a *regular siege* until it can be carried by an assault. Fig. 103 shows the manner of approach by *zigzags* and *parallels*. The parallels shown in the drawing, are trenches or saps having a general direction parallel to the trace of the besieged works, where are brought in succession the tools and materials to be used, and where the guards for the protection of working parties are posted. The *zigzags*

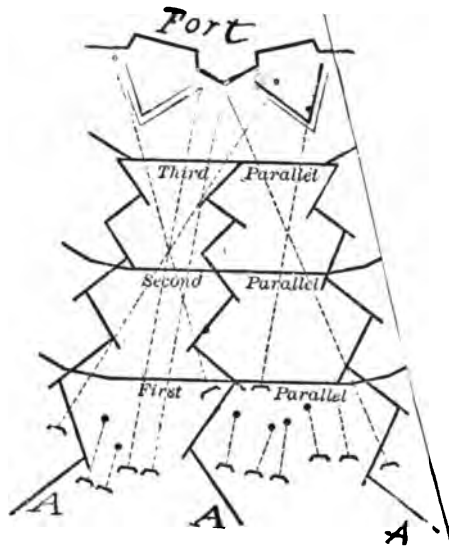


Fig. 103.

are the trenches or saps running forward towards the besieged work, from one parallel to another. These zigzags are shown in Fig. 103 starting from points marked "A," and terminating at the *third parallel*. Batteries may be placed at commanding positions outside the *first parallel* so that artillery fire may be kept up at intervals upon the fort, while the zigzags and parallels are being dug. As will be noticed in Fig. 103, a zigzag is given such direction that it cannot be enfiladed at any point by fire from the fort. To accomplish this its direction must be changed—first directed to a point just outside one flank and then to a point just outside the other flank. Hence the name *zigzag*. A siege is conducted under the general direction of an engineer officer,—usually the chief engineer on the staff of the General commanding the besieging force.

TRENCHES, SAPS, AND SAP-ROLLERS.

The strict technical meaning of a *trench* is speedy cover from an enemy's fire, made by digging a ditch and throwing the earth to the side towards the

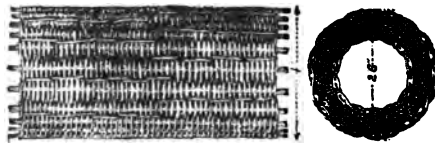


Fig. 104.

enemy to form a parapet. The term *sap* has a similar application, but takes its name from the *sap-roller*, see Fig. 104, which is used to roll ahead of the workmen to protect them in their first digging. A sap-roller is a hollow cylinder formed by making two concentric gabions, each 7 feet long, one 4 feet and the other 2½ feet in diameter, and filling the space between the two with rods from 1

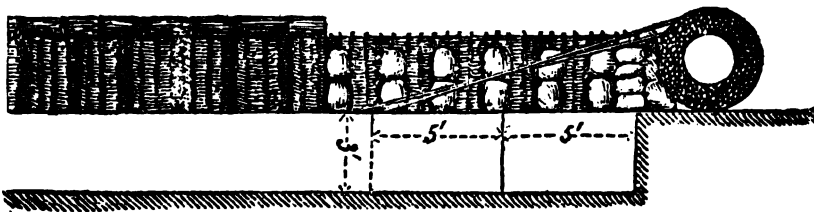


Fig. 105.

to 2 inches in diameter. Fig. 105 shows the manner of using a sap-roller. The workmen taking advantage of any slack in the enemy's fire roll the sap-roller forward and quickly fill the interval with gabions which are at once filled with dirt.

DEFENSE OF BUILDINGS, VILLAGES, WOODS, &c.

A building should be either of stone, brick or adobe and solidly built to become useful as a defensive structure, and large enough to hold a Company. It should also be sheltered from artillery fire, as any ordinary building would be quickly demolished by field artillery fire. Figure 106 gives a general idea as to how to prepare a house for defense. The inhabitants should be removed, also all

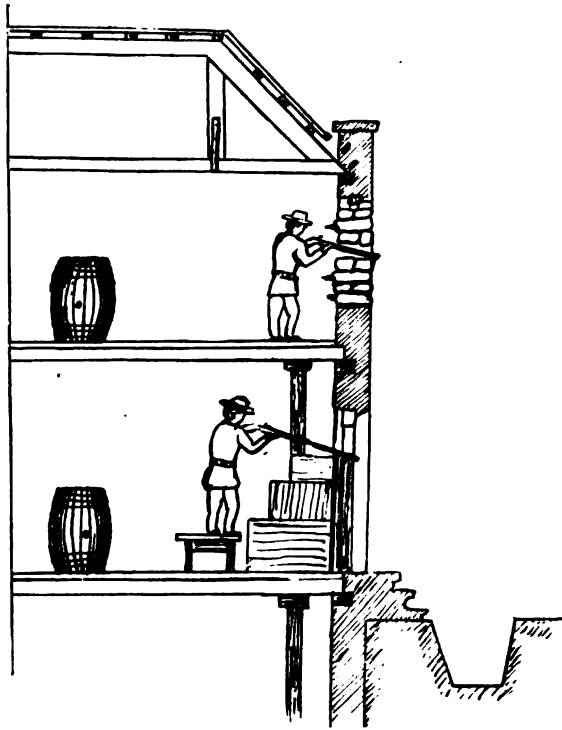


Fig. 106.

easily combustible material, as well as the glass from the windows. Doors and windows should be barricaded and loopholes made at the windows and doors and also at intervals along the walls. The floors should be shored up and there should be barrels of water placed in the rooms, both for drinking and extinguishing fires. A ditch should be dug around the outside of the house and the dirt from the ditch thrown up against the walls. If time permits, a trench to serve as a first line of defense should be dug 40 yards or so in front of the house.

Woods, villages and farms, which are to be held, are fortified on sides towards the enemy. Abatis and other obstructions are placed at the outer edge and hedges, fences, stone walls etc., taken advantage of to assist in making cover

for troops, such as will constitute a *first line of defense*. The buildings best adapted for the purpose would be prepared as the *second line of defense*, and serve as keeps or shelters for the troops.

ROADS AND BRIDGES.

Troops in the field have, frequently, to repair roads and even construct new ones. A road should be sixteen feet wide to allow wagons to pass each other. For wagons going one way, infantry in column of fours or cavalry in column of twos, a road nine feet wide will answer, but such a narrow road must have frequent turn outs.

In laying out a line of road it is better to go a long distance with an easy grade than to seek a shorter route over a steep grade. Even as great an increase as twenty feet in distance for every foot of vertical height avoided, may be advantageous.

Only about 80 per cent of what can be hauled, on a level, can be hauled on a grade of 1-50, and 25 per cent on a grade of 1-10. The latter should be the limit for steepness in road gradients, and this only for a short distance, e. g., an approach to a bridge; 1-20 is considered as the limiting gradient for easy travel.

A road-bed should be highest in the center and gently slope towards the sides. For such road-beds as the Macadam and Telford, see Fig. 107, the slope need be only 1-24, and there should be a shallow "gutter" on each side, and frequent closed drains leading to the ditch further out.

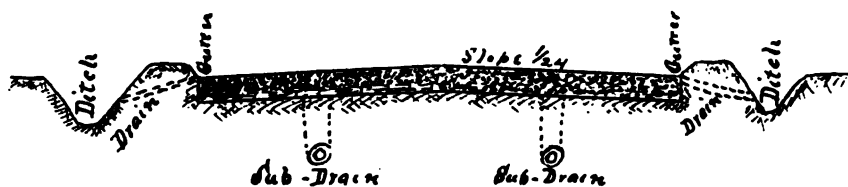


Fig. 107.

On steep hill-sides the surface of the road may be a single plane, inclined towards the hill, see Fig. 108, with one ditch, and with frequent covered drains under the road.

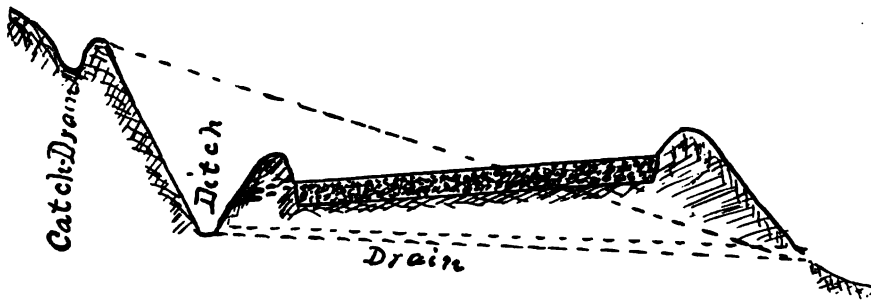


Fig. 108.

On steep roads small mounds (sometimes called bars) are placed obliquely across the road to arrest the flow of water running lengthwise of the road, and turn it into the side ditches.

Earth roads such as are usually made *across country* require greater care in drainage than those constructed of broken stone.

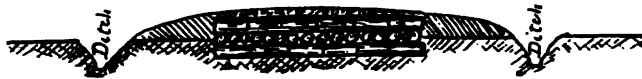


Fig. 109.

Fig. 109 shows the form of the cross country road-bed.

In marshy ground logs may be laid across the road, close together, and covered with earth, or gravel. This is called *corduroying*.

Fascines may be used, crossing each other in layers, as shown in Fig. 109.

The form of these roads is more rounding than that of broken-stone roads, and they should have large ditches next to the road-bed. *Plank-roads* are probably the cheapest and best to build in heavy sand. Heavy sills are first laid in the direction of the road about four feet apart and planks three inches thick spiked across them.

Plain, conspicuous guide-boards should be placed at all cross-roads.

BRIDGES, FERRIES, ETC.

The general subject of bridge building is too extensive for even "briefing" in this article, but a few ways of crossing streams, resorted to by troops moving across country, where there are no bridges, may be beneficial suggestions to those preparing themselves to meet such exigencies.

By a careful study of the *"pontoon bridge" and the engineer (or pontoon) train, (which carries the parts of this bridge) in connection with Plate II, it will be suggested to the intelligent student how, when regular pontoon boats, barks, chess, etc., are not at hand, rafts may be made to be used as substitutes for pontoon boats, by lashing vinegar barrels together, see Fig. 110; by covering wagon bodies with water-proof canvas, etc. If sawed lumber is not available hewn logs

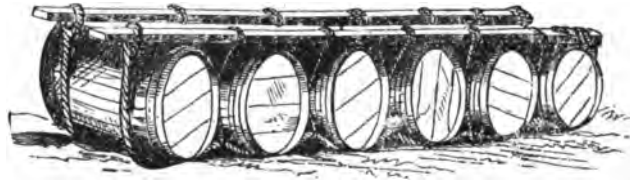


Fig. 110.

and poles may be used for "barks" and "chess," and anchors may be made of wagon wheels by removing the felloes and tires; by lashing together several pickaxes, or loading frames with stone. The anchors provided with the regular "pontoon trains" weigh from 75 to 150 pounds, but these substitutes, not being as good, may have to be heavier.

The number of anchors required will depend upon the force of the current. It is usually sufficient to anchor each alternate boat up stream and half as many down stream. If the stream is very rapid, the bridge should be secured to a *hawser* some ways up stream, see Fig. 111.

*See pages 34 and 35.

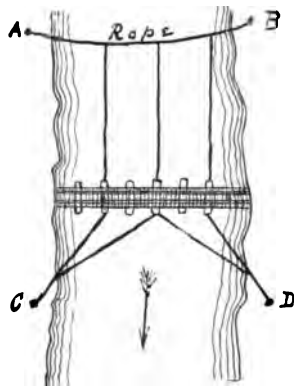


Fig. 111.

The *rope-ferry* may be used in sluggish streams. This consists in a rope stretched across the stream as at A B in Fig. 111, and drawing a boat or raft *by hand* along the rope. If there is a gentle current a pulling-wheel may be put on the rope and the current will take the boat across, provided the boat is given the proper angle with the current.

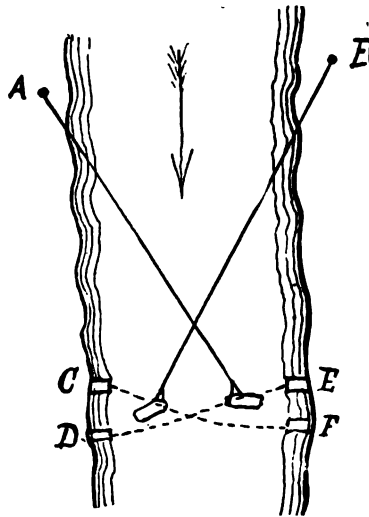


Fig. 112.

The *flying bridge*, see Fig. 112, is used when the stream is broad ; the length of the cable being one and one-half to two times the width of the stream. A

cable anchored at A would enable the current to take a boat from E to D if the boat be hitched properly to the cable, and a cable anchored at B would swing a boat across from C to F.

RAILROADS.

Railroads have come to be so important in warfare, not only for the transportation of rations and other supplies but for quick concentration of armies, that their construction and management, as well as their repairs and destruction, are considered elements of a military officer's education.

The construction and repairs of railroads will naturally be put into the hands of engineers, but all troops of the *line* are subject to be detailed to manage or destroy railroads.

RAILROAD MANAGEMENT.

There are two distinct organizations in this management. The *Department of Accounts* and the *Department of Operation*.

The Department of Accounts receives, audits and consolidates all accounts of money and property pertaining to the road and makes all payments. It is organized as follows:

General superintendent of accounts, brigadier-general.

Auditor of accounts, colonel.

Chief paymaster, colonel.

For each division in operation :

1 Paymaster, major.

1 Inspector of accounts, major.

A number of clerks sufficient to do the business of the road.

The Department of Operation, runs the trains and depots, purchases necessary stores, makes repairs, etc., and operates the telegraph line. It is organized as follows :

General superintendent, brigadier-general.

Chief engineer, colonel.

Master general of transportation, colonel.

Master general of motive power and rolling stock, colonel.

Inspector general, colonel.

General superintendent of telegraphs, colonel.

Surgeon in chief, colonel.

For each division in operation :

1 Division superintendent, lieutenant-colonel or major.

1 Division engineer, captain.

1 Division master of rolling stock, etc., captain.

1 Quartermaster, captain.

1 Division superintendent of telegraphs, captain.

1 Assistant surgeon, captain.

For each section :

1 Section inspector, lieutenant.

1 Section engineer, lieutenant.

For each station :

1 Station master, captain.

1 Train dispatcher, lieutenant.

1 Freight agent, lieutenant.

1 Telegraph operator, sergeant.

For each train :

1 Conductor, lieutenant

1 Guard, sergeant.

1 Engine driver, staff sergeant.

1 Stoker, private.

2 Brakemen, corporals.

Divisions average about 100 miles.

Sections average about 25 miles.

The *Guard* in the above list should know the contents and destination of every car in the train. When necessary to protect the train, such detachments of troops are detailed, from day to day, as may be required.



RAILWAY DESTRUCTION.

There may be two purposes in railway destruction, the first to inflict injuries sufficient to prevent the railway from being used by the enemy, and the second to render the road irreparable. The first purpose is usually accomplished by removing parts of the rolling stock and hiding them, or removing track for a few hundred yards at various intervals. To accomplish the second purpose, rails must be removed from the track and twisted, so as to render them unfit for use again in repairing the road, bridges must be burned, tunnels blown in, rolling stock destroyed, etc. Rails which are simply bent can be easily straightened by re-heating and hammering, and when only slightly bent can be straightened without even being re-heated. But a twisted rail can only be used again by being re-rolled.

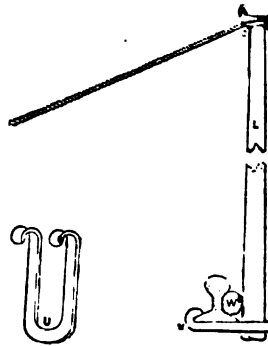


Fig. 113.

Fig. 113 illustrates a contrivance for twisting rails. It consists of a U-shaped piece of tough iron or steel (marked "U" in the figure) having its ends turned up into claws. This is forced under the rail until the claws catch the lower edge, and by means of a lever about 20 feet long, see "L" in the figure, and a rope at the end of the lever a squad of men can both twist the rail and pry it off from the ties. Two of these contrivances are put on the rail near together, and the levers pulled down in succession.

When a large number of men are available, select a high embankment, line the men along on one side of the track, disconnect the rails at each end of the line of men, raise the track on edge and roll it down the embankment.

By laying rails across a pile of burning ties until red hot, they may be twisted by putting bars or picks in the holes at the ends.

Wooden bridges can be quickly burned by starting fires at both ends, oil being put on the timbers to accelerate the fire.

Probably the quickest way to destroy a bridge is to blow it off from the abutments by the use of powder or torpedoes, and raiding parties carry, upon horses or in wagons, a supply of necessary caps and fuses for exploding it, and also explosives with the tools needed to prepare the place for its reception.

Tunnels are destroyed by blowing them in at various places, or by running engines in at each end so as to collide near the center.

CHAPTER X.

Tactics.

TACTICS, in contradistinction to strategy, is the art of handling troops in the presence of, or in the immediate vicinity of the enemy, while *strategy* concerns the greater operations of war, and movements which are at a distance from the enemy.

We have in times past been in the habit of calling our drill regulations *tactics*. This has misled many to the idea that what we find in the drill book is all that is needed to prepare us for war, and the purpose of this chapter will be to dispel this idea by leading the student who has well studied the drill regulations and become a good drill master on the parade ground into the broader field of application, viz : battle tactics.

INFANTRY TACTICS.

THE SQUAD.

In our Infantry Drill Regulations instruction begins with the smallest organized unit, viz : the squad, which consists of a corporal and seven privates, constituting, in close order formation, a set of fours. (See Fig. 114.)

The corporal is the leader and commander of the squad. He first instructs the men of his squad, in "the School of the Soldier"—Manual of Arms, bayonet-exercise, firings, etc.—in close order, and then, as skirmishers, in extended order. The latter is the *fighting line* for the squad. (See A, B, Fig. 114.)

The squad is the basis of extended order. All larger units are made up of squads intact, and officers and sergeants should give their especial attention to

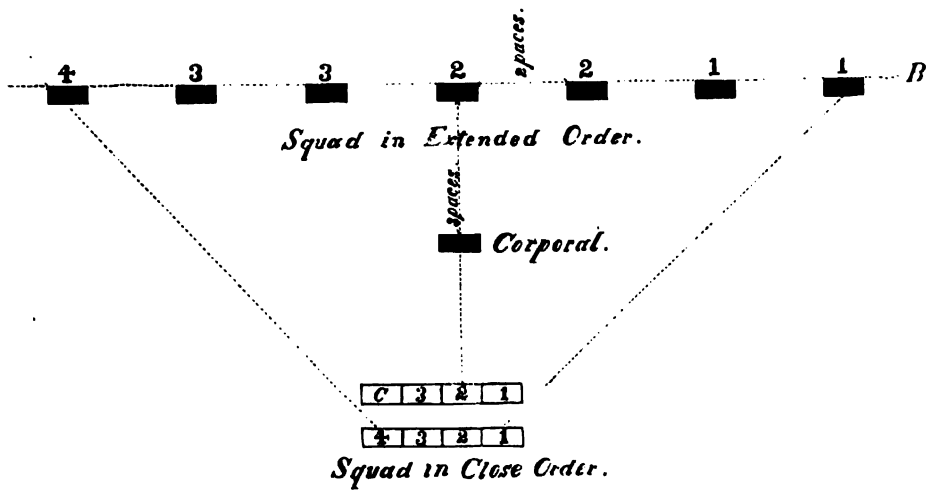


Fig. 114.

preserving the integrity of the squad ; they appoint new leaders to replace those disabled, organize new squads, when necessary, and see that every man is placed in a squad.

The corporal should give the closest attention to the execution of the firings. Volley firing is executed, by commands of the corporal, either when the squad is closed, or deployed. He may cause only the best shots to fire, or he may cause all the men to fire at will.

THE SECTION.

Three squads make up the next larger unit, the *section*, which is commanded by a sergeant. (See Fig. 115.)

At C the section is shown formed in close order. If the sergeant were to give battle to an enemy with his section, acting alone, he would at first only deploy two squads as a "firing line," as shown on the line A--B, and leave one squad as a reserve about 150 yards in rear, as shown at C. The heavy black lines of the illustration indicate the positions, after the line of squads has been deployed as a skirmish line.

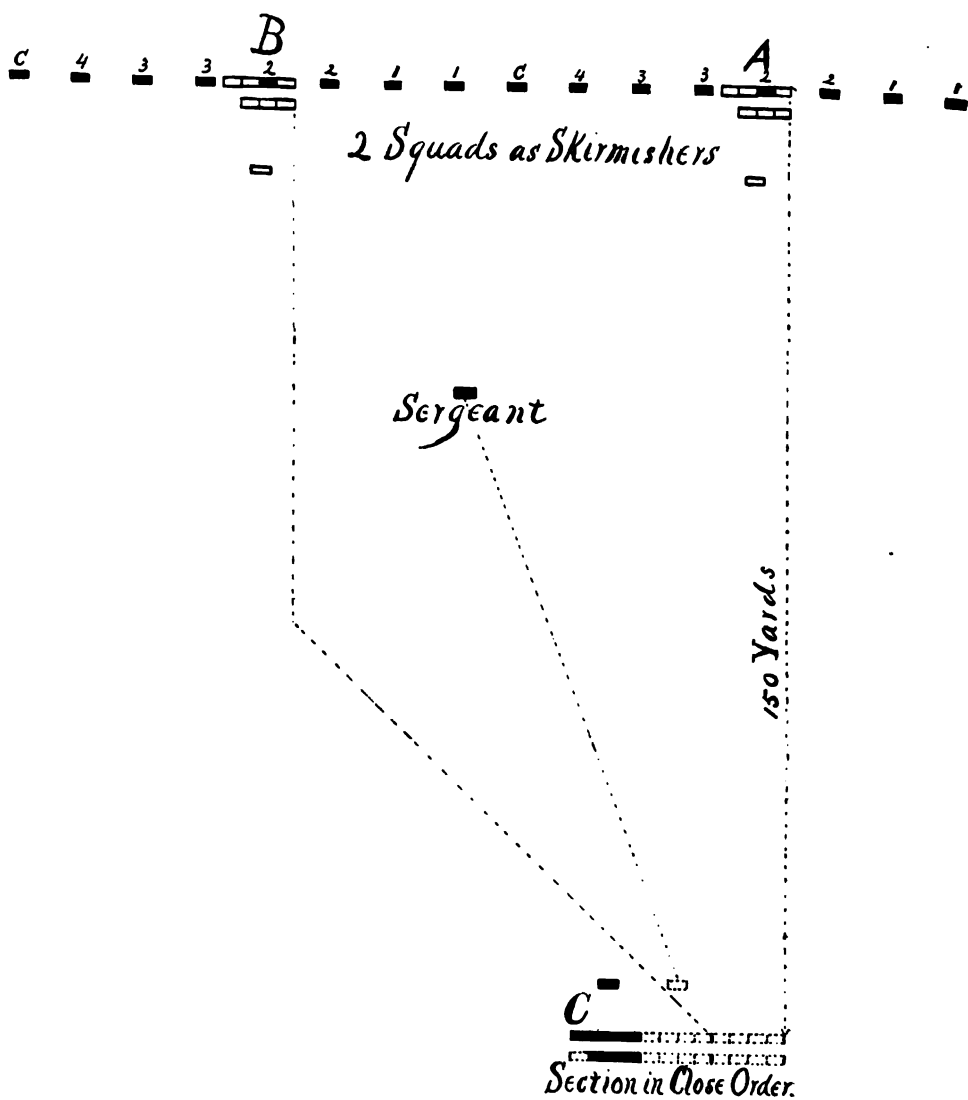


Fig. 115.

If the section formed a part of a larger unit, the larger unit would have a reserve, so there need be no section reserve, in which case all three squads of the section would be deployed on the firing line.

THE PLATOON.

Two sections (about 50 men) make up the platoon, (See Fig. 116), which is commanded by a lieutenant.

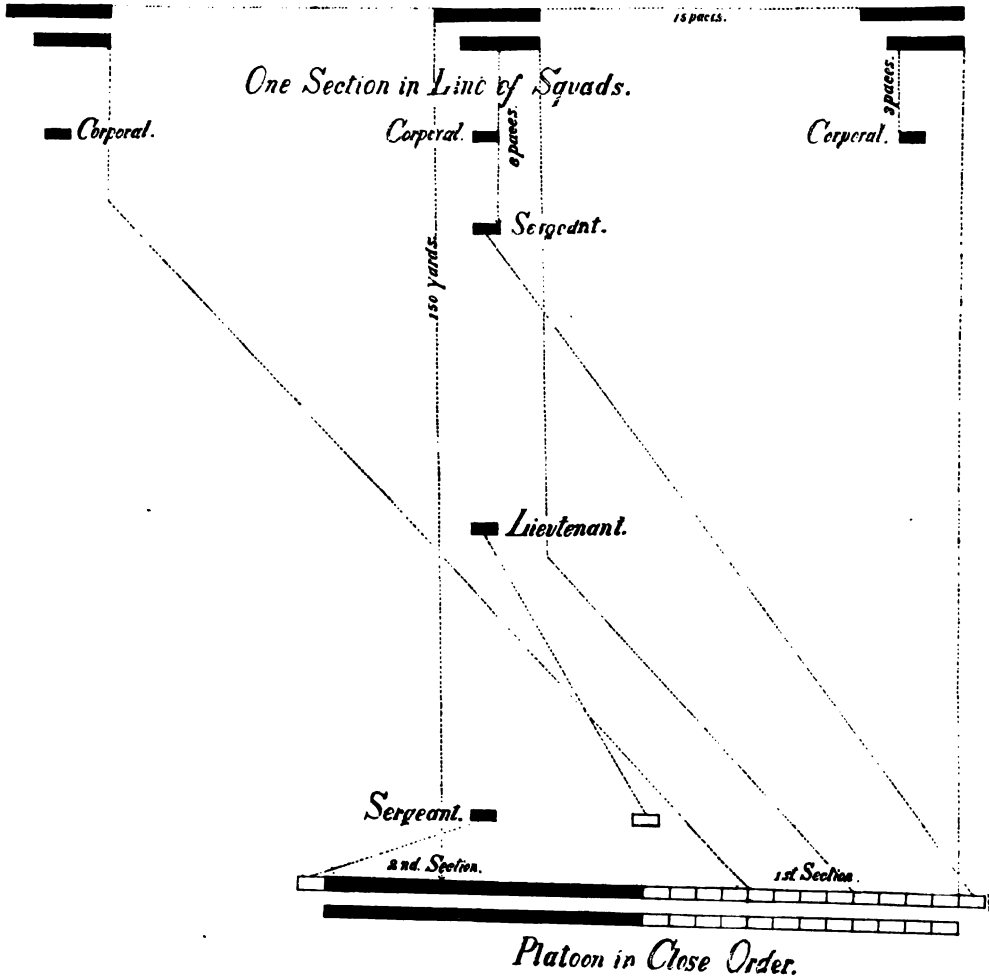


Fig. 116.

At the bottom of the figure the platoon is shown to be formed in close order, and the heavy black lines of the illustration show the extended order formation; one section deployed in "line of squads" and one section held as

reserve 150 yards in rear. The line of squads may be deployed to the front as in Fig. 114, or on their present line as in Fig. 115. When caught suddenly the whole platoon may be thrown forward as skirmishers, at once, in the manner prescribed for the squad.

But in this deployment one or two squads should be left at the deploying point, or sent still farther to the rear as a reserve.

Reinforcements are sent forward from the reserve to the "firing line" by squads (or groups) which deploy on the march, the men mixing in among the skirmishers already there.

Volley firing by squads or sections may be used when the front is of such extent that it can be controlled by the voice of the commander. But it will be found, in actual battle, that volley firing is impracticable very long after the fight has really commenced.

THE COMPANY.

Two platoons make up the company (three officers and 100 men) commanded by a captain. The close order formation is shown at A—B, Fig. 117.

When first coming into the zone of artillery fire, the company formed in this way (or in column of fours) advances until the artillery fire becomes effective (about 2,500 yards from the enemy.) Then the captain sends a few scouts forward under a non-commissioned officer and takes the battle formation shown in the figure; two sections (usually the second and third) being thrown forward ready for deployment as the *firing line*, and two sections "echeloned" 200 yards in rear as supports.

When about 1,400 yards from the enemy the firing line is formed into *line of sections*; at 1,200 yards, *line of squads*, and 900 yards, *line of skirmishers*.

When about 800 yards from the enemy the scouts may find it necessary to halt and await the arrival of the firing line.

When the advance should no longer continue without firing, the captain directs the number of volleys to be fired at each halt, and gives the commands for commencing firing.

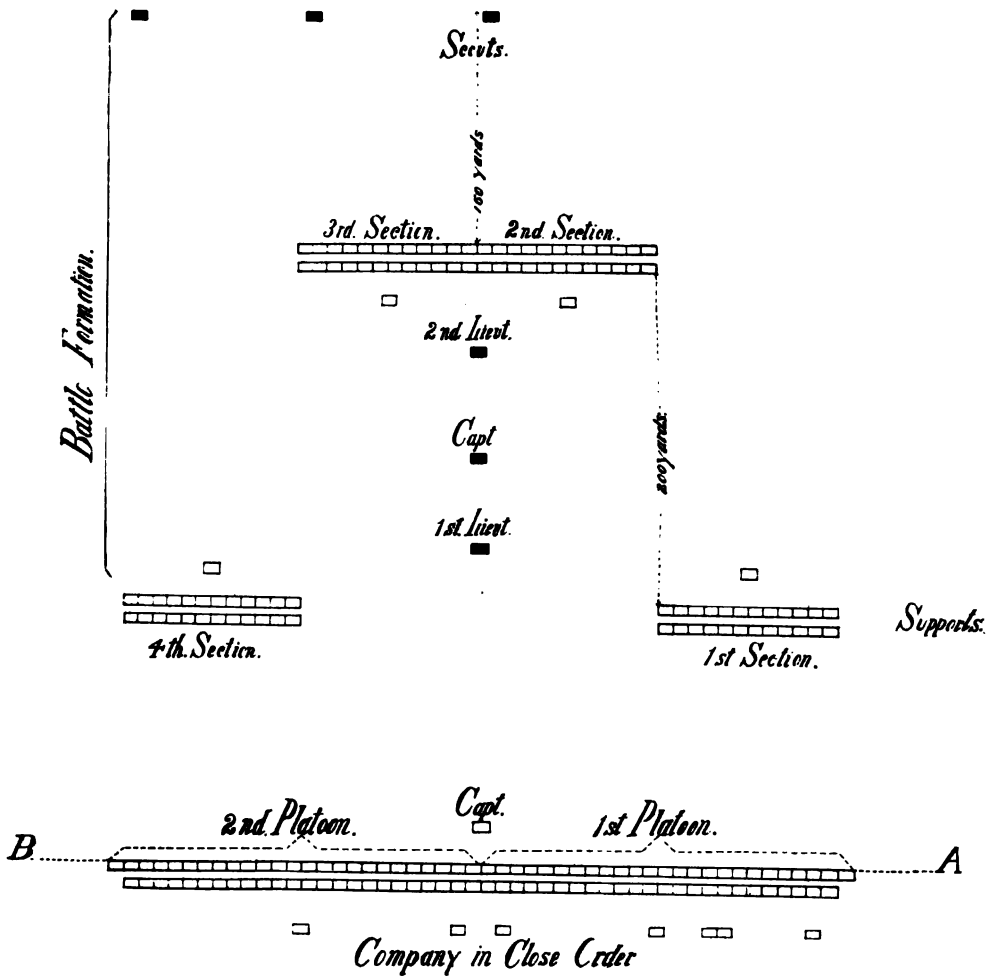


Fig. 117.

Volley, by squads, are used against troops in close order at distances not exceeding 800 yards at a line equal to the front of a squad ; 1,000 yards at a line equal to the front of a platoon ; 1,200 yards at a line equal to the front of a company.

The *fire at will* is used at distances varying from 800 to 400 yards.

The *rapid fire* is used at short ranges,—300 yards and less.

The *firing line* may advance from cover to cover *by rushes* executed by the whole line or by alternate sections.

The arrival of the support on the line should be taken advantage of for a rush forward.

When it becomes necessary to increase the intensity of the fire, the captain sends forward the supports to reinforce the firing line. Previous to this time supports should be kept under cover as much as possible.

When the firing line reaches favorable ground the captain causes bayonets to be fixed and *rapid fire* to commence. When arriving at about 30 yards from the enemy, *cease firing* is sounded and the command *charge* given. The men then come to charge bayonets, quicken their pace and advance upon the enemy. Having driven the enemy from his position, the captain selects ground in front favorable for firing upon the retiring enemy, or for resisting a counter attack.

In case of a repulse the captain prepares to renew the attack.

If a line be retreating when the supports are brought up to reinforce it, the supports deploy and become the *firing line*: the retreating line passes through the intervals, assembles and becomes the support.

A company acting alone might be deployed in three "echelons," a *firing line*, a *support* and a *reserve*, having at first only one section in the firing line, one section in the support and two sections in the reserve.

THE BATTALION.

There are four companies in a battalion (427 officers and men) commanded by a major. At the bottom of Fig. 118 the battalion is shown formed in close order in line, and above this, the "formation for attack" is shown; the first and fourth companies being taken for the reserve and the second and third companies for the *fighting line*. The reserve is held about 300 yards in the rear of the supports, under cover if possible.

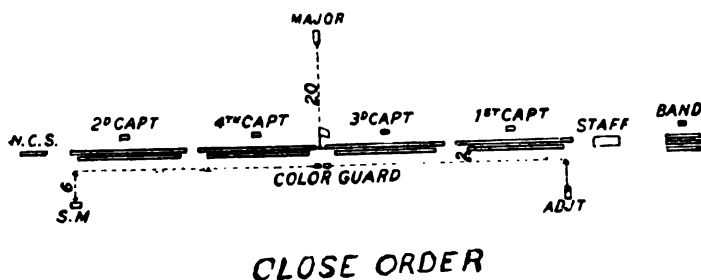
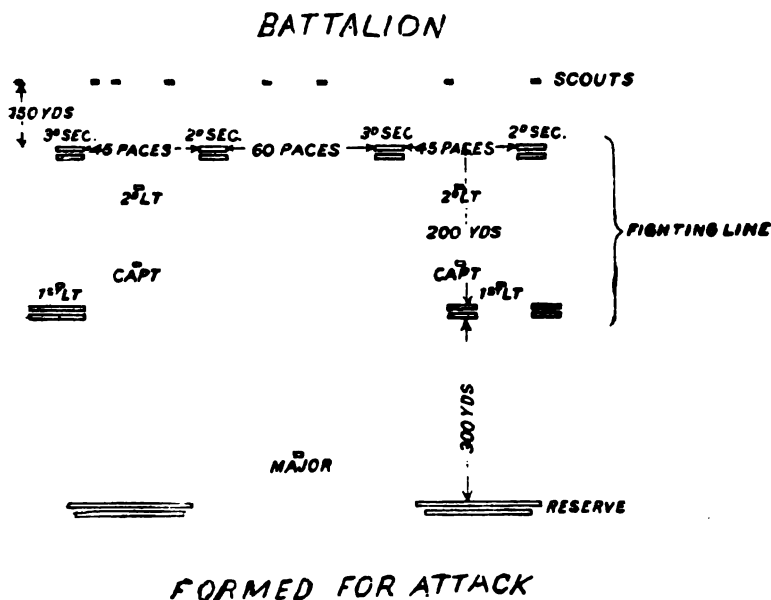


Fig. 118.

Mounted officers dismount when the firing begins, their horses being taken back to the reserve.

The attack is made as prescribed for the company. When the "color" is with the battalion taking the battle formation, it joins the reserve; or if the battalion be in the regiment the color joins the regimental reserve.

THE REGIMENT.

Three battalions, together with the "field, staff and band," make up a regiment (*1,306 officers and men). The regiment is commanded by a colonel.

Fig. 119 shows the *close order* formation of a regiment in line.

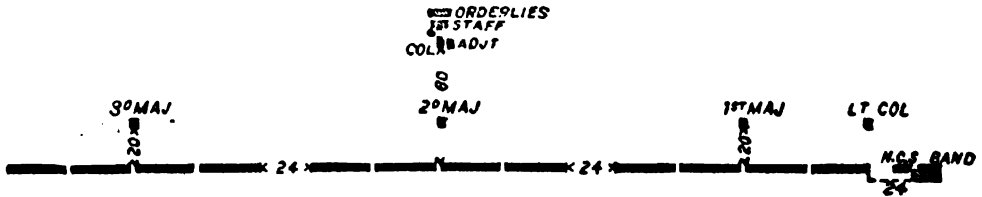


Fig. 119.

The regiment is *formed for battle* in two or three lines, depending upon the extent of front to be occupied.

The three line formation is the one generally adopted when the regiment is acting alone and will be the one illustrated in the following "figures." Fig. 120 shows the formation for attack when the regiment arrives at 3,000 yards from the enemy.

Before entering the zone of artillery fire, (about 3000 yards from the enemy), the regiment is formed "front into line in three line"; (see Fig. 120.) The first battalion constitutes the first line and "forms for attack"; the second battalion constitutes the second line and forms in line of platoon columns, 600 yards in the rear of the *reserve* of the first line; and the third battalion, also formed in line of platoon columns, constitutes the third line.

When about 1200 yards from the enemy the firing line (first battalion) forms "line of squads" and the support line of sections, the reserve still continuing in line of columns.

At about 900 yards, see Fig. 121 the firing line deploys as skirmishers, the support in line of squads and the reserve in line of sections. The scouts open fire and await the arrival of the firing line.

*See page 13.

3000 yards from Enemy

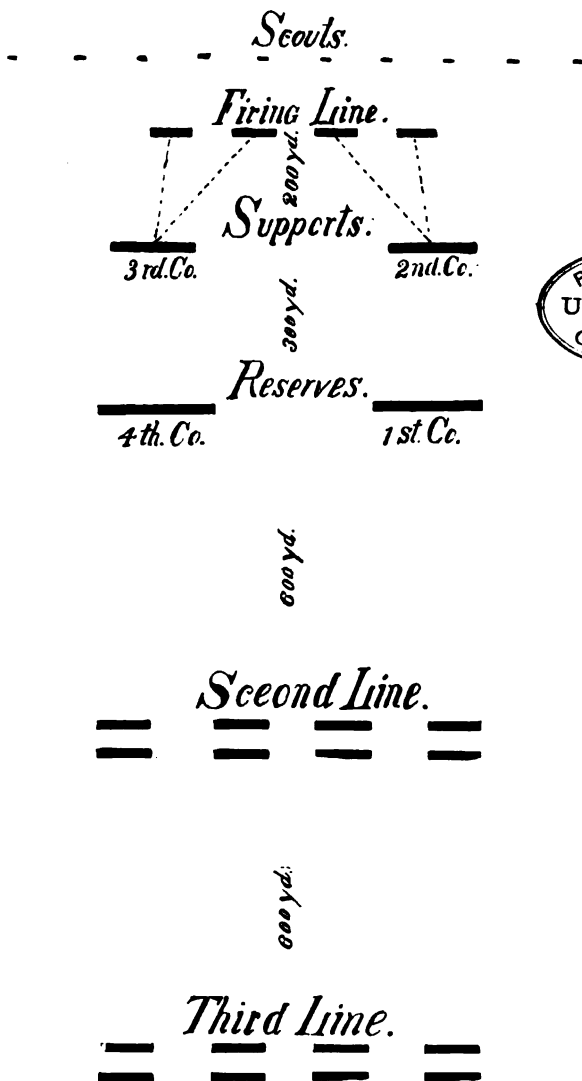
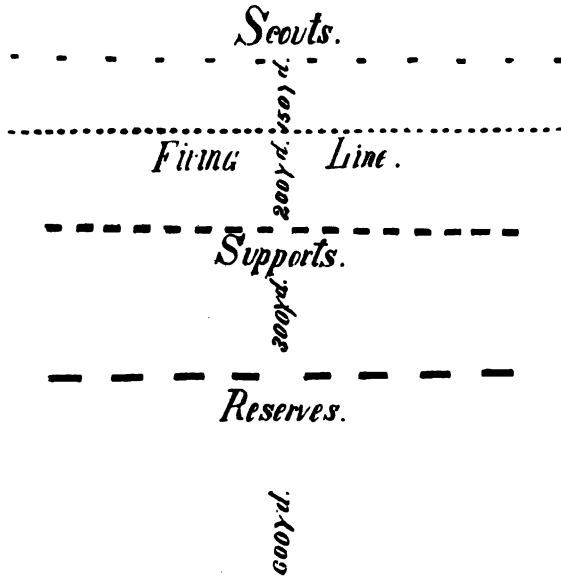


Fig. 120.

At 800 yards the firing line opens fire (usually by volleys.)

200 yards from Enemy.



= = = =

Second Line.

600 yd.

= = = =

Third Line.

Fig. 121.

At about 500 yards from the enemy the *supports* join the firing line, and advance is made by rushes ; the *reserve* takes the battle formation, and the second line forms line of platoons. See Fig. 122.

500 yards from Enemy.

Firin Line - Advancing by Rushes -

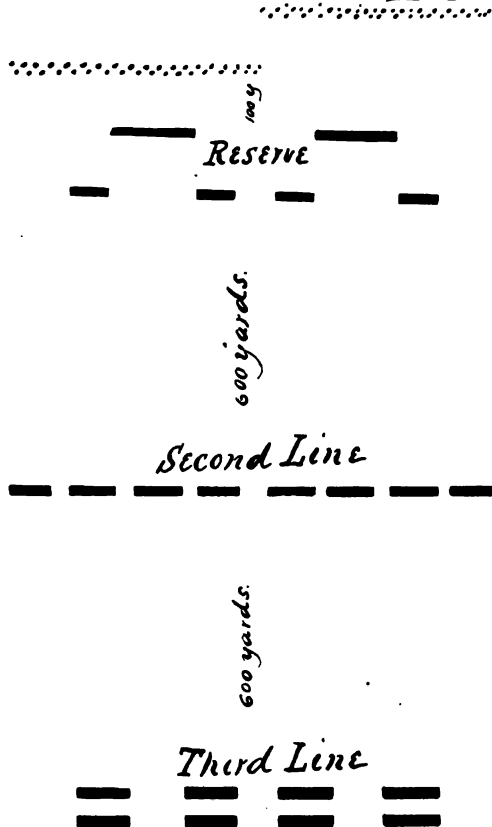


Fig. 124.

At about 200 yards from the enemy the reserve is deployed into the firing line, and the second line deploys into line of squads. See Fig. 123.

The line fires here *kneeling* or *lying down*, depending upon the ground, till the second line comes up to reinforce it. As the two lines unite, the colonel cause the *charge* to be sounded and the men rush forward at charge bayonets, with a hurrah. See Fig. 124.

200 yards from Enemy.

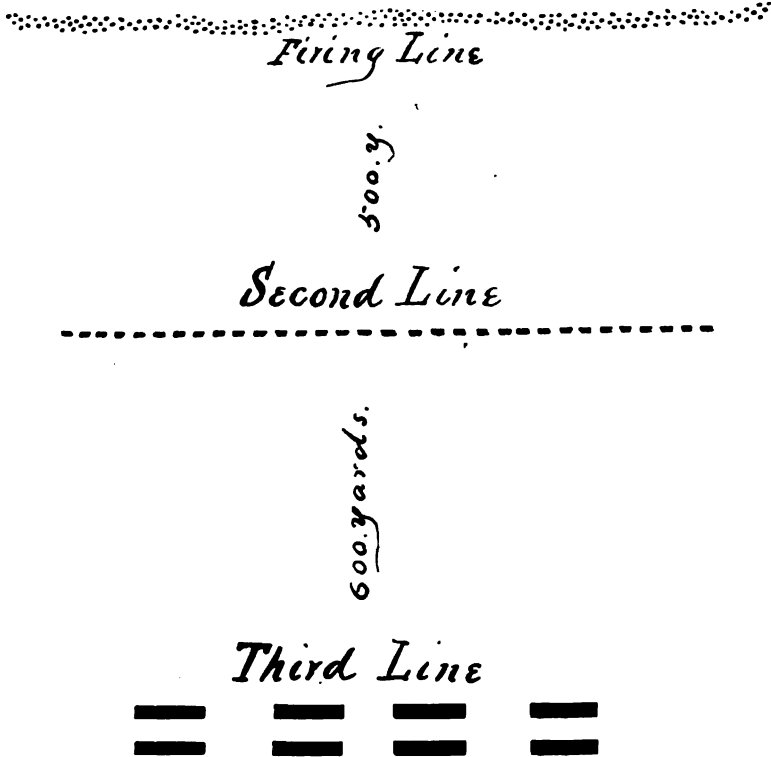


Fig. 123.

The third line hastens forward to occupy the captured position or meet a counter charge, and the first and second battalions are assembled on the third battalion.

AMMUNITION SUPPLY.

Each infantry soldier carries 100 cartridges in his belt, and two 4-mule ammunition wagons (or an equivalent number of two-wheeled carts) are allowed

The Charge

Firing Line

600 yards.

Third Line



Fig. 124.

to an infantry regiment for carrying, immediately with the regiment, at least 36 extra cartridges per man. When taking the "battle formation" the vehicles containing this ammunition should be placed not more than 1200 yards from the firing line, sheltered as much as possible. (Usually with the reserve.)

At critical moments the commander may direct these regimental wagons to be moved up rapidly to the firing line. Sixty-four rounds more per man are carried in the "ammunition column" which forms a part of the corps or division train in rear. This provides, in all, 200 rounds per man, (100 in the belt, 36 in regimental wagons and 64 in ammunition column). As the battle progresses the men's belts must be refilled from the regimental wagons and the regimental wagons as they become emptied must be replenished from the ammunition column.

Pack animals at the rate of one to each infantry company should be provided for getting ammunition up to the firing line, as well as for other useful purposes in a company; but in the absence of animal transportation a certain number of men of the various companies must be used as "ammunition carriers." A non-commissioned officer should be put in charge of this important work and given the requisite number of men for replenishing the empty belts. This should constitute a part of the drill for each company in time of peace, so that men will not have to do this work for the first time under fire. This squad of ammunition carriers should be with the regimental ammunition wagons, and be ready to carry forward the supply as ordered or signalled.

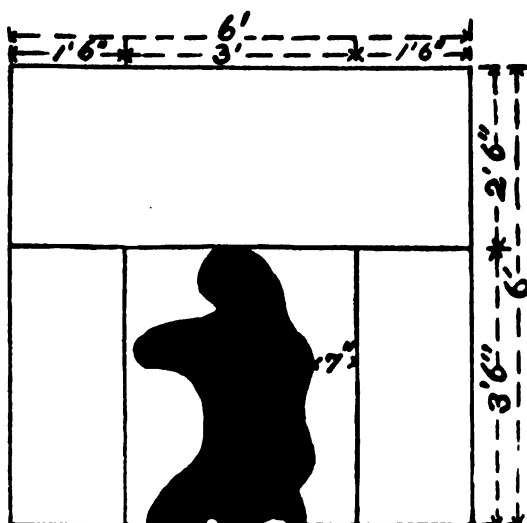
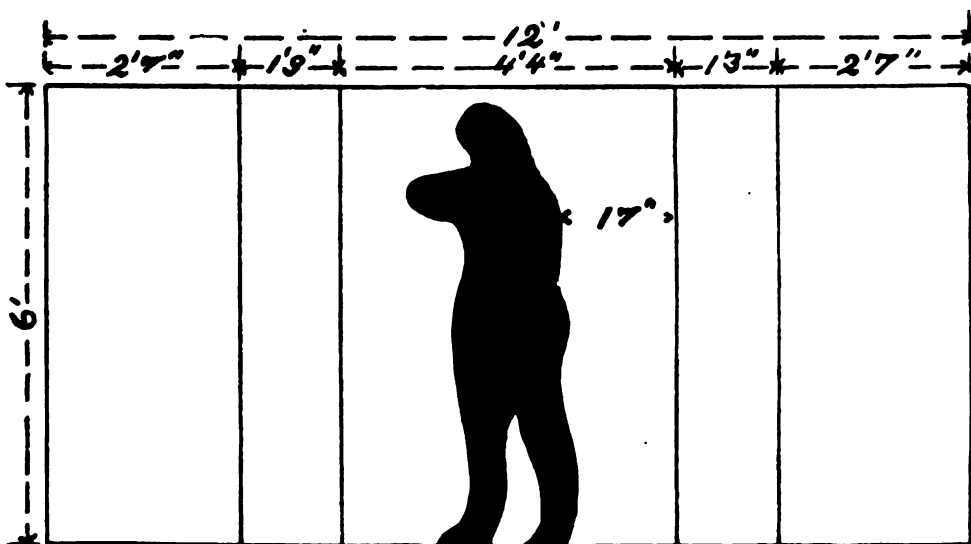
It is not well to send men back from the firing line for this purpose. The difficulty of replenishing ammunition furnishes a potent reason for rigid *fire discipline*. Not only should infantry commanders reserve their fire until they come within effective range but every man should be impressed with the idea of holding fire upon every cartridge until he feels reasonably certain that by pulling the trigger he will hit some one of the enemy.

The modern infantry battle does not mean the reckless exposure of former days, except at decisive moments. It means cool, deliberate courage, which only comes through self-composure, incident to a thorough acquaintance with the details of the soldier's "trade."

TARGET FIRING.

A new system of targets, marking and scoring, for known distances, has recently been adopted for use in the regular army, based upon the idea of always "using the figure of a man as the object to be hit—and putting the figure at the bottom of the target," so that the soldier will get in the habit of aiming low, (at the feet of a line of men).

For the "short range" target shown in Fig. 45 the target shown in Fig. 125 has been substituted.



The figure is the silhouette of a soldier in the lying position. The *center* is a rectangle, 22 inches high (the height of a soldier lying) and 4 feet wide (the width of the target), the figure while included in the rectangle, not being, of course, a portion of the *center*. The *inner* is a rectangle whose height is the distance between the upper boundary of the *center* and a line drawn parallel to it at a distance of 42 inches from the bottom of the target (the height of a soldier kneeling), and its width the width of the target. The *outer* is the rectangle which forms the remainder of the target. The entire target, as shown in the plate, is a rectangle, 6 feet high and 4 feet wide.

For the mid-range target shown in Fig. 46, the target shown in Fig. 126 has been substituted.

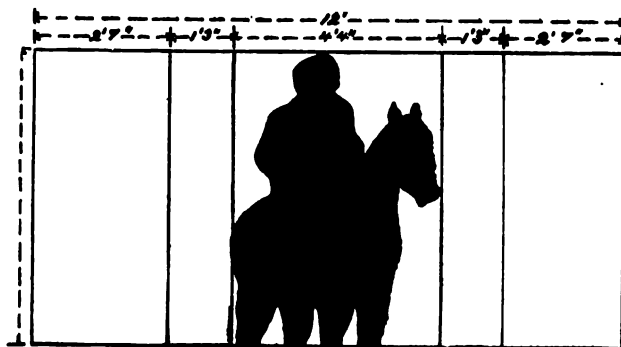


Fig. 128.

This target is a square 6 feet on a side. The *figure* is the silhouette of a soldier in the kneeling position. The *center* and the *right* and *left inners* are rectangles whose heights are the same (42 inches, the height of a soldier kneeling); the width of the *center* being 3 feet and of each of the *inners* 1 foot 6 inches. The *outer* is the remainder of the target, and is a rectangle, 6 feet wide and 30 inches high.

For the 700 and 800 yard target shown in Fig. 47, the target shown in Fig. 126 has been substituted.

This target is a rectangle 6 feet high and 12 feet wide. The *figure* of this target is the silhouette of a soldier standing. The *center, right inner, left inner, right outer, and left outer*, are rectangles the height of each being 6 feet (the height of the target). The width of the *center* is 4 feet 4 inches ; of each *inner*, 1 foot 3 inches, and of each *outer*, 2 feet 7 inches.

Fig. 128 shows the 1000 yard target.

This target is the same shape and size as Fig. 127. The *figure* is the silhouette of the mounted soldier, the legs of the horse being cut off at a height of 2 feet from the ground.

On either of these targets a hit on the figure is scored 5 ; a center 4 ; an inner 3 ; an outer 2 ; a miss 0.

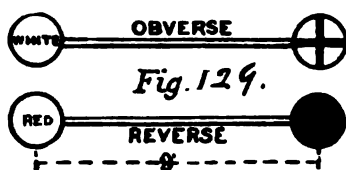


Fig. 129.

Fig. 129 shows the disks used in marking, which are the same as for the targets shown in Figs. 45, 46 and 47.

The white disk marks a hit on the black figures, the red disk a center, the black and white disk an inner, the black disk an outer.

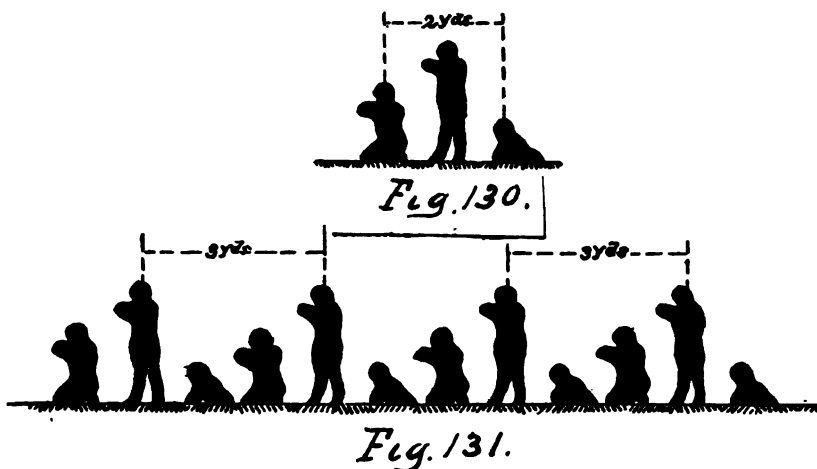
SKIRMISH TARGETS.

For skirmish firing by squads (see page 154) the three figure targets are placed in a line forming a group, the standing figure in the center, see Fig. 130.

Fig. 131 shows the targets arranged for company field practice.

The above is to be studied in connection with "rifle firing," pages 141 to 158 in this book.

It is believed that the old system of "bulls-eye" targets is the best to use at first with recruits and even for militia or volunteers who have but little time for practice. But as practice goes on the new system may well be substituted.



***THE BRIGADE.**

The brigade consists of three regiments, but may have a less or greater number; it is commanded by a Brigadier General.

The brigade may be formed for battle in one, two or three lines, but the strongest formation for attack is with the regiments side by side, each in three lines, as has been illustrated by Figs. 120, 121, 122, 123 and 124.

This gives three battalions to each line and allows the men of each regiment to be kept together as they may be thrown forward to reinforce the firing line.

Plate I shows an infantry brigade acting alone, formed for the march. When taking the battle formation the trains should be parked at some place in rear of the lines under cover, if possible.

The brigade is the largest tactical unit composed wholly of infantry. Frequently a battery of artillery and a small force of cavalry are attached to an infantry brigade, acting alone or as an advance guard.

Machine guns, see Figs. 4 and 141, at the rate of one to each battalion, should be component parts of infantry commands.

*See page 13.

CAVALRY.

Cavalry is organized similarly to infantry, into troops, squadrons, regiments and brigades, and also into *cavalry divisions* and *cavalry corps*, the two latter, as well as the cavalry brigade, containing besides cavalry some *horse artillery*.

These several cavalry units are organized for separate and independent action, or for combined action with other arms, e. g., in a *separate army*, (like the "Army of the Potomac," in the War of the Rebellion) there is one *cavalry corps*, and besides this cavalry corps each of the other corps constituting this separate army would contain one or more regiments of cavalry called "Corps Cavalry" in contradistinction to the above named "Cavalry Corps," and a division serving as an independent command would also have at least one squadron of cavalry forming a part of the division. See Plate II.

The *Cavalry Drill Regulations* is a book containing the tactical movements and instructions for mounted troops. The commands, however, are assimilated as far as practicable to those for infantry and artillery, so that mixed bodies of troops, whether made up of small or large detachments of the separate "arms" can be manœuvred by one commander.

As the *field and staff* officers, as well as non-commissioned staff officers, orderlies, etc., of all arms and corps are mounted, some of the elementary instruction for cavalry is necessary to them.

Fig. 5 illustrates the cavalry soldier mounted and equipped for field service, and the text therewith describes his equipage in detail. This may serve to illustrate the mounted man's equipage in other arms. In fact ex-cavalry soldiers may well be enlisted for orderlies with an infantry regiment, as practical cavalry experience and training are essential for this important duty. Not only should these men be skilled riders, but they should understand the care and treatment of horses, as the care of officers' horses under whom they serve forms an important part of their work. They may not be required to carry the carbine, but should be equipped with sabre and pistol and be proficient in the use of these weapons.

Fig. 132 shows a mounted trumpeter equipped for the field.



Fig. 132.

SADDLES AND BRIDLES.

Fig. 133 shows the McClellan saddle. This is the proper campaign saddle for officers and men of all arms, as it provides for carrying the overcoat as well as the blanket roll and attaching saddle-bags and other equipments necessarily carried on the horse, at times, by all ranks and grades who have occasion to be

mounted. In campaigns the sabre is usually suspended to the near pommel ring, as shown in the figure.

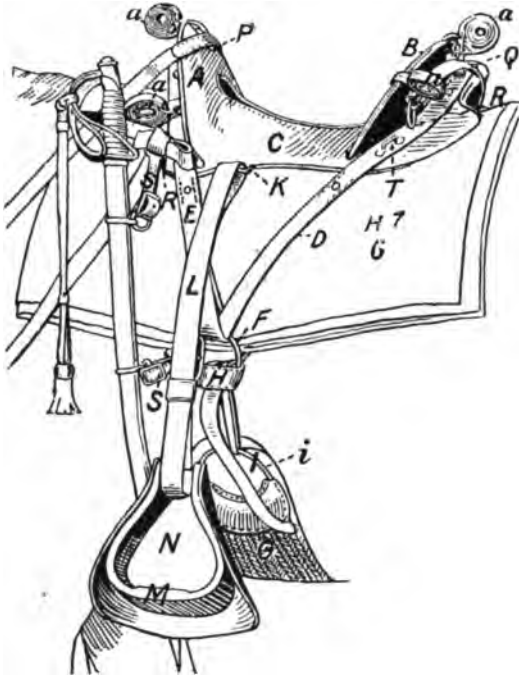


Fig. 133.

Fig. 134 shows the regulation cavalry bridle, which is the best kind of a bridle for officers on field service.

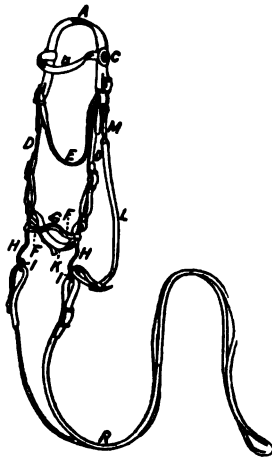


Fig. 134.

An officer should have a well-bred, well-broken horse (a gelding) weighing from 1000 to 1100 pounds, and standing from 15 to 16 hands high. An officer has a saddle cloth over the saddle blanket and the saddle cloth has on each side the number of the officer's regiment, if he be a line officer, or insignia by which he is recognized as a staff or general officer.

An officer in campaign carries a revolver upon the right side of the belt. The belt is prepared for carrying a supply of cartridges and is worn on the outside of the blouse. Fig. 135 shows an officer's belt and revolver.



Fig. 135.

Fig. 137 shows a staff officer in field uniform, mounted.

Fig. 138 shows the formation of a cavalry troop in line in close order.

The formation is similar to that of an infantry company, except that cavalry always forms in single rank and lieutenants are in front of their platoons.

Mounted men are reckoned as occupying one yard in width and three yards in depth.

The squadron and regimental formations are similar to those for the battalion and regiment in infantry. The drill manœuvres for each corresponding



Fig. 137.

organization are also similar to those for infantry, except that all close order movements are directed to one purpose, namely, "shock-action" produced by the charge in which the sabre is the weapon used. The cavalry is also drilled for "fire action" in extended order mounted and dismounted, in which the carbine does about as effective work within limited ranges, as the infantry rifle.

EMPLOYMENT OF CAVALRY.

"*The Cavalry Corps*" of an army conducts independent cavalry operations as may be directed by the army commander; either operating in the "recon-

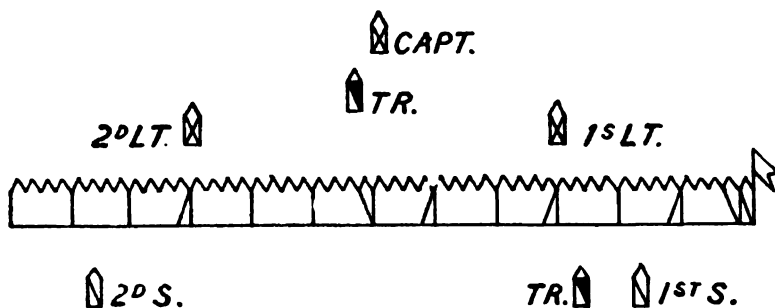


Fig. 138.

noitering screen" between two hostile armies or more extensively around the flank and to the rear of the enemy's army; sometimes going clear around the army to cut his communications, to prevent other forces from joining the enemy's army, or to cause alarm in the enemy's country.

It may, and frequently does, divide up into "raids."

The "Corps Cavalry" (so called because attached by one or two regiments to each infantry corps) performs screening duty for that corps.

Fig. 139 may serve as a general illustration of a "cavalry screen" moving in front of a corps to which it may be attached.

This screen, made up of 2 regiments and 2 squadrons, would cover the country perhaps for 10 to 20 miles in front of the advance guard of the command of which it forms a part (possibly a division, corps or separate army).

In a corps awaiting an attack the position of the corps cavalry is shown in Fig. 144, in rear and on the flank, so as to move at the opportune moment of battle where it may best operate or to pursue the routed enemy.

The "shock action" of well handled cavalry in mass is its legitimate function, still the reconnaissance, patrolling and advance guard duty in which fire action mounted and dismounted is the most conspicuous, has in later years given cavalry a role covering "mounted infantry" work as well as cavalry service pure and simple, and greatly increased its influence.

Cavalry Screen.

Two Regiments and Two Squadrons.

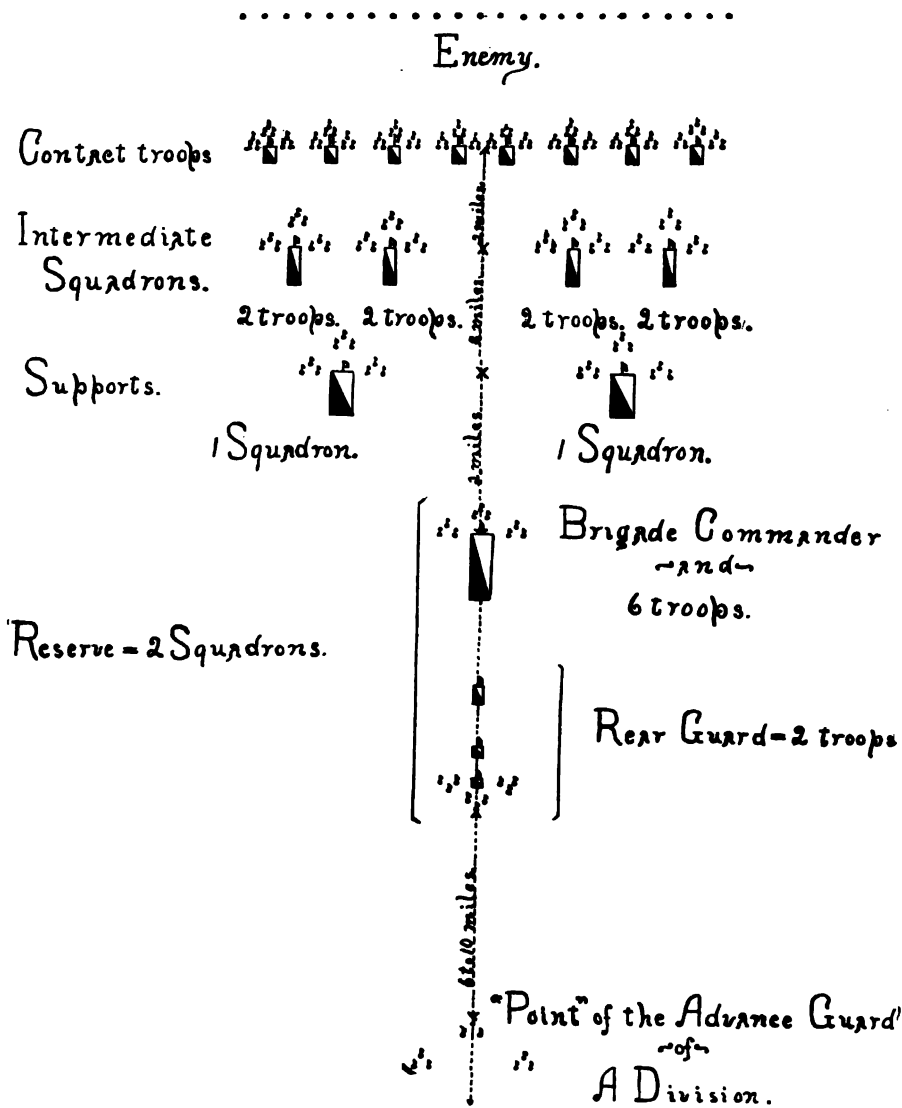


Fig. 139.

To fight on foot 3 men of each set of fours are dismounted while the 4th man of the set remains mounted to handle the horses of the other three, and the horses are all taken back under cover while the dismounted men deploy as infantry skirmishers.



Fig. 140.

Fig. 140 shows the horses of a troop being led back under cover of the hill, while the dismounted skirmishers can be seen on the brow of the hill to the left.

MACHINE GUNS.

Machine guns are intended for use against troops and transportation animals. They use small-arms metallic ammunition, the same as is used in infantry rifles or cavalry carbines. The machine guns adopted by the United States Army are the Gatling gun and the Gardner gun. The Gatling gun is shown in Fig. 4; the later model of the Gatling gun has a shield shown in detail in Fig. 141.

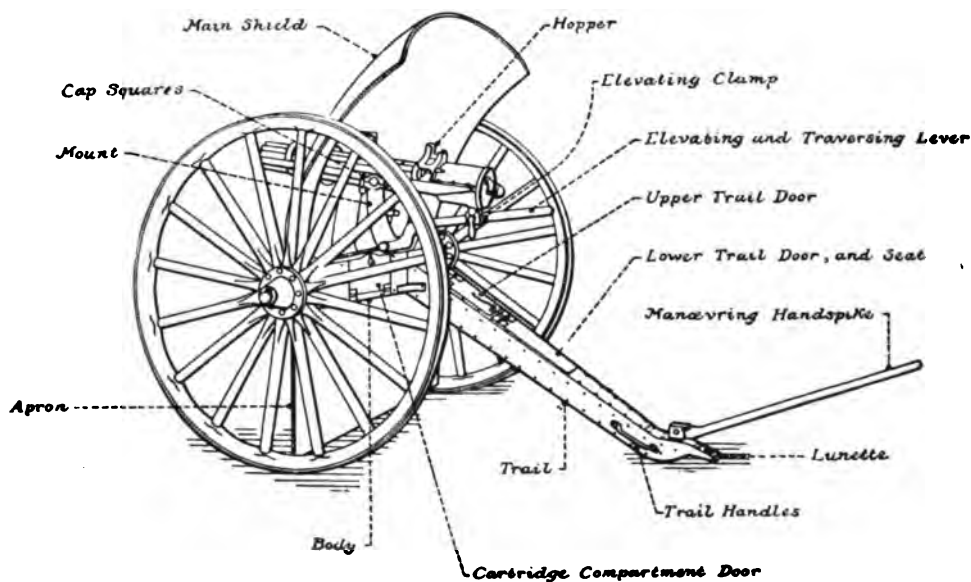


Fig. 141.

The gun is operated by a crank, and can be given an oscillating movement covering a large field of fire. The Gatling gun is probably the best for a company of cavalry, and there should be one or two of these guns with every squadron or troop acting independently. In battle formation they should be held with the reserve until the progress of the fight demonstrates a suitable position for their use. Fig. 142 shows the small Gatling gun intended for use with cavalry, and its carriage and team.

This gun is mounted on a two-wheeled carriage drawn by two horses; the off horse in shafts and the near horse free to be detached. There are two ammunition boxes on the cart with the gun.

The detachment for the service of this gun consists of a corporal and four privates, two of the privates riding the horses which draw the carriage.



Fig. 142.

ARTILLERY.

Fig. 143 shows the formation of the "light field battery," in line prepared for action. The battery on the war footing consists of six 3.2 inch guns and six

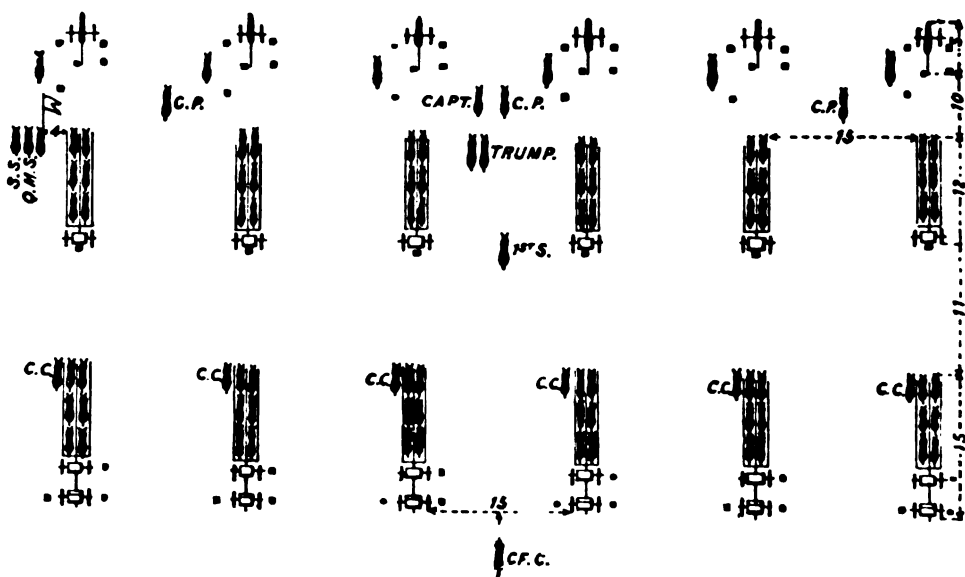


Fig. 143.

caissons with six horses to each carriage. There are also three extra caissons, a battery wagon, forge and store wagon not shown in the figure.

Horse batteries are formed the same as shown in the figure, except that there is a horse for each cannoneer to ride, in addition to the horses in teams for drawing the carriages.

There are mountain batteries in which the pieces are transported on pack animals, and also machine batteries, designated according to their equipment and model of guns, e. g., Gatling, Gardner, etc.

A battery is commanded by a captain. Four batteries form a battalion, which is commanded by a major.

The light artillery of an army corps consists of divisional artillery and corps artillery. The divisional artillery consists of a battalion (four batteries.)

The corps artillery consists of two or more battalions, in addition to the artillery in each division; it is composed of field and horse batteries in suitable proportions.

A battalion of horse artillery is attached to and is a part of each division of cavalry. In smaller commands, a battery may be attached to an infantry or cavalry brigade.

The proportion of light artillery is from three to four guns to one thousand men.

The Light Artillery Drill Regulations comprises the "school of the soldier" mounted and dismounted, and instruction for drivers and cannoneers, battery and battalion manoeuvres.

The light artillery usually moves by battalions, but regiments and brigades are organized for administrative purposes.

PROJECTILES.

The *shell is used to destroy parapets, buildings, palisades, etc., or to set fire to houses and villages, and also against troops in mass.

*See pages 14, 15, 28, 29, 30 and 31.

Shells are also used for trial shots, to find the range before using shrapnel, as the puff of smoke from the bursting shell can be plainly seen, while that from the shrapnel can not. The shell is effective at 4,000 yards.

†Shrapnel is used against troops in all formations. The shrapnel is effective at 3,000 yards.

†Canister is a projectile for close quarters, 400 to 500 yards.

With each field battery (in limbers and caissons) are carried 231 rounds per gun and 41 rounds per gun extra are carried in the ammunition column, which is attached to the corps artillery.

EMPLOYMENT OF ARTILLERY.

The principal duty of artillery, in the offensive, is to prepare for the infantry attack. To fulfil this duty, the entire artillery comes into action on commanding heights at the earliest moment to engage in the artillery duel, and endeavors to subdue the hostile artillery fire.

For the positions of artillery on the march of a division see Plate II. As far as safety will admit, troops are arranged for marches in the order in which their services will be required in battle. For the position of artillery in a corps formed for attack see Fig. 144.

In the defensive, artillery acts first to prevent the assault and afterwards to defeat it.

Machine batteries can be employed by platoons, or even by single pieces, as each machine gun delivers continuous and rapid fire.

THE DIVISION.

A Division consists of three brigades of infantry and four batteries (one battalion) of artillery with three companies of the Hospital corps and, if serving independently, a small force of cavalry is attached.

This is the normal organization, but a Division may have a less or greater number.

†See page 111.

Fig. 144.

Plate II shows the marching formation of a Division. The general formation of a corps awaiting an attack (Fig. 144) may serve to illustrate the general manner of forming the Division for the same purpose: that is, if the Division be serving alone.

A Division is commanded by a Major-General.

THE CORPS.

The Corps may contain two or three divisions, with the addition of one or two regiments of cavalry (known as "corps cavalry"). Major-Generals, senior to the division commanders, are assigned to command corps.

Fig. 144 shows a model formation for a corps of two divisions posted to receive attack, in *three lines*. Such a corps would have about 25,000 men. In fact, it has generally been conceded that an army should be divided into corps containing not more than 25,000 men.

However, if the corps is to act independently *three* divisions may be put in one corps.

In posting troops for battle the topography of the country would of course somewhat vary the geometrical accuracy shown in Fig. 144, but the commander should have this model in mind and come as near to it as practicable.

The artillery of the first, or "fighting line," should be so posted as to give a cross fire in front of the infantry, and the second and third lines should be given some natural cover, if practicable, near enough to be in supporting distance.

Fig. 145 shows an army corps (about 43,000 men) posted according to the nature of the country.

The corps is supposed to be marching on the road from C to D, and when in the vicinity of C the commander learns that the enemy, in force, is approaching towards the village at D, and he is obliged to hurriedly occupy a position to resist the enemy's advance.

A hasty reconnaissance shows him that the best natural position for his corps to occupy for this purpose is the high ground, or ridge, extending from A to B; the distance from these points being about 3 miles.

The ground slopes gently from the top of the ridge A B, to front and rear, and he determines to establish his first line on the top of this ridge. There is an unfordable river on the right with only one bridge at F, so that his right flank is covered. There is a woods of considerable size near the left of his position at G. These woods are too large to be slashed and must be strongly defended to prevent the enemy's getting possession of them. Therefore the left of the line must be made the stronger.

He puts his first line on top of the ridge and his second line very near the first, because the slope to the rear prevents the direct fire from the enemy's doing harm to the second line, and his reserves are placed in the columns at convenient distances in rear of the second line.

RECONNOITERING.

In tactical no less than in strategical operations the importance of reconnoitering is apparent. Every commander, whether of a large or small force, must keep informed of the enemy's movements, both when framing and executing his plans, and the surest way to have accurate information of the enemy is to keep constantly in touch with him with our own light troops.

Cavalry is generally used, if available, but in the absence of cavalry other troops must make their own reconnaissances, and mixed commands if skilfully handled, will best meet the varying circumstances of country, e. g.: when there are woods, heights, swamps or villages infantry can more successfully operate than cavalry, and it frequently happens that bridges are met incapable of bearing cavalry.

* EXAMPLE RECONNAISSANCE BY A MIXED COMMAND.

(Two troops of cavalry and one company of infantry, total 300 men.)

A force consisting of all arms (for example a division; see Plate II) is moving up the east side of the Connecticut River. (See Fig. 146.)

* The example is one taken from *Clerry*, applied to a section of country in New Hampshire.

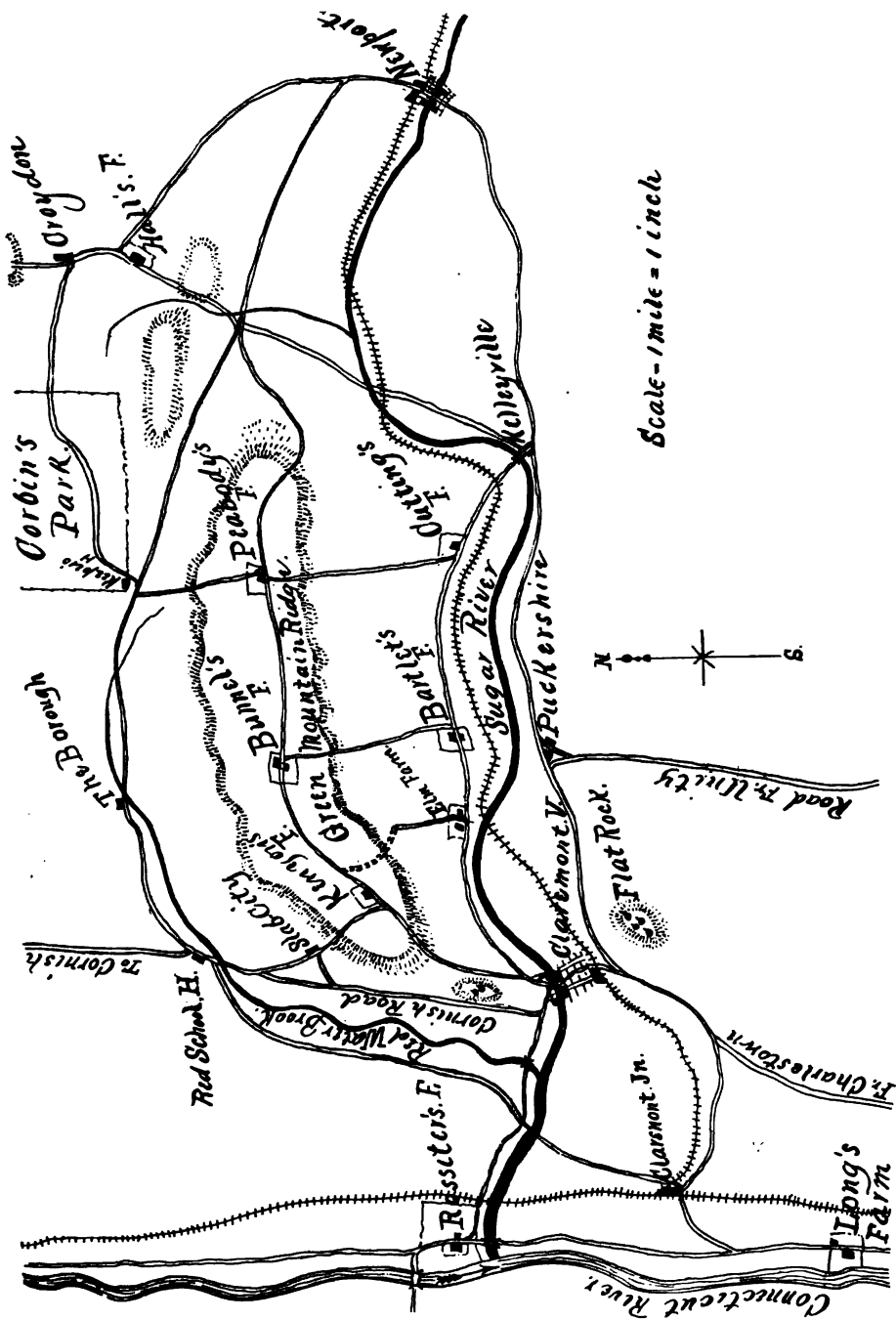


Fig. 146.

(Above scale is two miles to the inch instead of one mile to the inch, as shown by error in the plate.)

Having arrived at Long's farm, about four miles southwest from the village of Claremont and about the same distance from the bridge across the Connecticut River at Rossiter's farm where the Sugar River joins the Connecticut, the commanding officer hears that the enemy's scouts have appeared in the vicinity of Corbin's Park, about ten miles to the northeast. He therefore determines to send a reconnoitering party in that direction at daybreak the following morning.

The country north of the Sugar River after crossing the "Green Mountain Ridge" is known to be open, and as the force is short of cavalry he sends a mixed party of cavalry and infantry,—the purpose of the infantry being to hold the bridge over the Sugar River at Claremont village, and thus by rendering the retreat of the cavalry secure, enable them to act with greater freedom beyond the river. The spring freshet has swollen the Sugar River so as to make it impassable for troops except at the four bridges, (at Rossiter's farm, Claremont village, Kellyville and Newport), all the other bridges having been swept away. The reconnoitering party consists of two troops of cavalry and one company of infantry (30 men in all) and the whole is placed under command of the officer commanding the cavalry.

The party is ordered to breakfast at 4.30 A. M. and to move at 5.00 A. M.

The following instructions are given over night to the officer commanding the reconnoissance :

"Reports have been received that the enemy's scouts were seen near Corbin's Park to-day. You will reconnoiter beyond the Sugar River in the direction of Corbin's Park, Croydon and Newport, to ascertain if these reports are correct, and to obtain what information you can about the enemy. A company of infantry is added to your command with a view to securing your retreat over the Sugar River should you be pressed back by the enemy.

A small cavalry patrol will move to Rossiter's farm at the same time that you start from this camp, to watch the bridges over the Connecticut and Sugar

Rivers at that point, and, if necessary, communicate with you at Claremont village."

The party moved at the hour named the following morning.

The country between the camp at Long's farm and the village of Claremont being quite open, the cavalry moved in advance of the infantry along the road toward Claremont village via Claremont Junction, sending one-half troop forward as *advance guard*, the advance guard sending forward one non-commissioned officer and four troopers as a "point" and two troopers on each flank as "flankers."

When nearing Claremont village the main body of the advance guard halts south of the village, while the "point" moves through the center, and the "flankers" round the east and west to explore. The "point" and "flankers" finding no enemy in the village, unite, and halt at the bridge crossing the Sugar River.

Upon report being received from the non-commissioned officer commanding the "point" that the village is clear, the commander of the advance guard orders it to move on to the bridge and sends scouts along the roads on the north side of the river for about a mile east and west to observe, and moves the advance guard on to Kenyon's farm on the Green Mountain Ridge. The main body follows, keeping its usual distance from the advance guard.

Upon arriving at the bridge, the officer commanding the party directs that two troopers from the main body be left to observe from a high point on the Cornish Road, and that the scouts from the advance guard previously sent out in that direction rejoin the advance guard.

He leaves the following instructions to the officer commanding the infantry :

"I am going to reconnoiter with the cavalry towards Croydon and Newport, taking my main force over the "Green Mountain Road" via Kenyon's farm, Bunnell's farm and Peabody's farm.

According to my information, the enemy's cavalry may be met in that direction. As I may have to fall back before a superior force, I leave the infantry at

Claremont village to hold the bridge over Sugar River and cover, if necessary, the retreat of my cavalry squadron. You will make your dispositions accordingly."

He next details a corporal and two men from the troop which furnished the advance guard with orders to move along the road following the south bank of Sugar River, through Puckershire and push on to the bridge at Kellyville. If the enemy were met, information was to be sent back to the officer commanding at Claremont village, and upon arriving at Kellyville to join the officer moving via Cutting's farm. He also details another party from the same troop, consisting of an officer, a corporal and six men, and gives to the officer the following instructions :

"I am going to reconnoiter along the "Green Mountain Ridge" towards Croydon. Move your party along the road north of Sugar River, by Bartlet's farm and Cutting's farm to Newport to cover my right. When you arrive at Bartlet's farm communicate with me by the cross road leading towards Bunnel's farm. I shall halt at that point until I hear from you, and you will not advance beyond Bartlet's farm till your messenger returns to you with instructions from me."

This party was placed under an officer because this was the usual route of travel from Croydon via Newport to Claremont, and the enemy might be coming this way and necessitate that the party act for itself. Another party consisting of a sergeant and four men is directed to move on the Cornish Road, by the Red School House and the Borough, to Corbin's Park, and to communicate via Slab City with the advance guard at Kenyon's farm, and from Corbin's Park with the main body at Peabody's farm, and not to advance beyond Corbin's Park until instructions came.

To the commander of the advance guard, who was present while these different orders were given, he gave the following verbal orders :

"Advance along the Green Mountain Road towards Croydon. Halt at Kenyon's farm until you have exchanged communications with the left patrol

and at Bunnell's farm until you can communicate with the officer commanding the right patrol, as far as Peabody's farm, at which place you will halt to await further instructions from me."

The following was then the disposition of the party :

Claremont village : One company of infantry.

2 troopers (Cornish Road).

2 troopers (orderlies).

Right patrol to Cutting's farm, 1 officer, 1 corp. and 6 men.

Right patrol to Kellyville, 1 corp. and 2 men.

Left patrol to Corbin's Park, via the Red School House, 1 sergeant and 4 men.

Advance guard, $\frac{1}{2}$ troop.

Main body, $1\frac{1}{2}$ troops.

Upon arriving at Claremont village the officer commanding the infantry sends one section, 25 men, (as an "outpost") across the bridge to take posts at the cross roads near the village ; the remainder of the company is posted in the village on the south side of the river ; with a "Cossack post" (corporal and 3 men) on Flat Rock, a high point just south of the village, to observe.

The main body of the cavalry moved over the "Green Mountain Ridge" as far as Peabody's farm and communicated with the right patrol at Cutting's farm and the left patrol at Corbin's Park without discovering the enemy.

The right patrol was ordered to move from Cutting's farm towards Newport and the left patrol to move through Corbin's Park towards Croydon, while the main body was halted at Peabody's farm. Patrols from the advance guard scouted along the road towards Croydon as far as Hall's farm without reporting any signs of the enemy, but were there ordered to halt and await the arrival of the main body. Report came to the commanding officer of the advance guard from the left patrol, which was passing through Corbin's Park, that the enemy's cavalry scouts were advancing from Croydon towards Hall's farm.

The commander of the advance guard passed back the report to the commander of the squadron, adding, "I am going forward myself to reconnoiter."

He then ordered the advance guard to follow at a walk, and galloped forward to join the "point."

The commander of the advance guard overtook the corporal in charge of the "point" at a commanding point overlooking Croydon, engaged in conversation with a tin-peddler who had just come from Croydon.

The latter stated that about a quarter of an hour before some 6 or 8 of the enemy's cavalry arrived at Croydon. Two of them had ridden up to the woods on the left (towards Corbin's Park) and while he was watching them one of the two galloped back to Croydon. He was followed very soon by the other. He added that he had seen no other parties of the enemy about.

The commander of the advance guard then discovered a mounted party of the enemy in the road just beyond Croydon, and two more mounted men at the cross road near Croydon. He sent back this information to the commander of the squadron, adding that he would move on against this party with the main body of his advance guard.

But before he could carry this out one of the two men at the cross road near Croydon, joined the enemy's party at a gallop, and the result was that the whole party fell back over the ridge north of Croydon, out of sight. The commander of the advance guard considered that this movement confirmed the tin-peddler's report, and that these were the enemy's advance scouts who had discovered the "left patrol" in Corbin's park and had fallen back because they feared that they might be cut off from their main force.

In the meantime the main body of the squadron had moved forward to the cross-road beyond Hall's farm. Here reports reached the commander from the right and left patrol. The right patrol reported that it had reached Newport without discovering any signs of the enemy and was halted there awaiting further orders.

The left patrol reported that two of the enemy's scouts had been met with on the road from Corbin's Park to Croydon and had at once fallen back. That the patrol was advancing cautiously on Croydon.

He now hurried forward to join the commander of the advance guard.

Upon consultation with him he concluded that the enemy's party seen on the road beyond Croydon, was most probably the advance party of a large body, but he felt obliged to continue his advance to further develop the strength and movements of the enemy. While giving instructions to the commander of the advance guard to this effect, a party of the enemy's cavalry, apparently about a squadron, appeared to the east of Croydon, and at the same time a heavy dust was observed to the northwest of Croydon, and the enemy's party which had disappeared over the hill in the road beyond Croydon appeared to have been reinforced and were returning towards Croydon.

The commander ordered a squad of the advance guard to be dismounted and open fire on this advancing party of the enemy. This stopped their advance, and they again retreated over the hill.

The dust seen to the northwest proved to be from two or three squadrons of the enemy's cavalry moving towards Croydon.

The commander now sent an officer and four men off to the northeast to discover the enemy's movements in that direction. This officer returned, reporting the movement of quite a body of the enemy's cavalry towards Newport.

He could not risk holding his advance position longer against so large a force, so he decided to retreat.

To the commander of the right patrol at Newport, he sent the following order :

"About a regiment of the enemy's cavalry is advancing towards Newport. Fall back by the road you advanced to Kellyville and try to communicate with me at Peabody's farm. If pressed, retire by the road south of the river and join me at Claremont. I shall fall back by the route I advanced."

To the left patrol he sent orders as follows :

"Enemy advancing in force. Retire to the Keeper's house in Corbin's Park and try to communicate with me at Peabody's farm, to which place I am falling back. If pressed fall back to Claremont village by the way you advanced."

To the commander of the advance guard he gave the following order :

“I am going to fall back as far as Peabody’s farm. Cover my retreat as rear guard.”

At the same time he sent word to the commander of the infantry at Claremont village that he was being driven back by a superior force of the enemy’s cavalry.

The cavalry then fell back to positions as follows :

Main Body : On high ground just east of Peabody’s farm.

Rear Guard : Watching the country to the northeast between Peabody’s farm and Hall’s farm.

Right patrol : At Cutting’s farm.

Left patrol : At Keeper’s house in Corbin’s Park.

The enemy’s scouts soon appeared over the hills from Hall’s farm. They were stopped by the rear guard, but the commander of the reconnaissance had accomplished the purpose of his expedition and did not think it prudent to attempt to hold his position. So he sent the following order to the commander of the right patrol at Cutting’s farm :

“The enemy is advancing. There is danger of your being cut off from me, so withdraw your party across the bridge at Kellyville and join me at Claremont village by the south bank of Sugar River via Puckershire.”

He sent the following instructions to the left patrol at the Keeper’s house :

“The enemy is advancing. Fall back by the route you advanced to Claremont village.”

The main body, followed by the rear guard, then withdrew at a walk via Bunnell’s farm and Kenyon’s farm.

Soon after this movement began the scouts of the rear guard were chased by a party of the enemy. But the rear guard turned and attacked this party and drove them back.

The scouts reported that about a regiment of the enemy’s cavalry was advancing on the Green Mountain Road.

The rear guard continued its retreat, sending a report to the commander of the main body.

The latter now ordered the rear guard to rejoin the main body, leaving scouts to watch those of the enemy, and continued the retreat with the whole body at a trot.

The enemy's cavalry now pressed on, and the scouts were again driven in.

As the party neared Claremont village the enemy's cavalry came in view near Kenyon's farm, and one squadron was discovered coming down the trail and rode past Elm Farm, evidently intending to cut off the retreating party from reaching the bridge at Claremont village.

The commander of the retreating squadron then gave the order to gallop, and continued the retreat at a gallop to the village.

The enemy followed until stopped by the fire of the infantry, which was suddenly opened upon them as they neared the entrance to the village.

This fire obliged the enemy to fall back rapidly out of range.

In the meantime the left patrol, having retreated too slowly from Corbin's Park, found itself cut off from reaching Claremont village by a troop of the enemy's cavalry which moved via Slab City, and this left patrol was obliged to move from the Red School House by a road leading down Red Water Brook and make its retreat via Rossiter's farm.

The cavalry of the retreating party now fell back through Claremont village, but the infantry held all the entrances to the village and the enemy made no further attempts to advance, but withdrew out of sight. The commander then sent scouts forward again to discover what was going on. These scouts reported that the enemy had fallen back over the Green Mountain Ridge, beyond Bunnell's farm.

After remaining about an hour at the village to make sure that the enemy was really falling back, the commander of the reconnaissance returned to the camp at Long's Farm, and rendered his report, which was to the effect that a large body of the enemy was evidently advancing from the northeast, probably

intending to cross Sugar River at Newport. The cavalry which had followed him being but the advance guard of the enemy's force.

CONVENTIONAL SIGNALS USED BY SCOUTS, POINTS, FLANKERS, VIDETTES, &C.

Figures 147, 148 and 149 explain themselves.



Fig. 147.



Fig. 148.



"Asking for Reinforcements."

Fig. 149.

To signal "The enemy is attacking in force," the carbine is fired in the air.

Too many signals should not be used as they become confusing. The above are considered enough, except that commanders and scouts may agree upon such signals as suit occasions.

CHAPTER XI.

Strategy.

As was stated in the previous chapter, strategy concerns larger operations of war than simply fighting battles, but it includes all that leads up to its broader sphere, battle tactics, as well as moving and supplying armies over large areas of country, even across seas and oceans. It is the study for generals rather than subordinate officers for whom this elementary book is prepared. But in this Government by the people, when war comes, men from the peaceful avocations of life are suddenly thrust into the uniforms of generals because of their political prominence, and started off to practice strategy as well as tactics, and have to study up the two together, therefore, a brief outline of strategy will be given here, adapted to the wants of the "citizen soldier."

Hamley,—the greatest of strategical writers,—says, "The theatre of war is the province of strategy,—the field of battle is the province of tactics. All operations must ultimately rely for success upon power of fighting, for it is of no avail to conduct an army into situations which it cannot maintain in battle. It is, however, the object of strategy, so to direct the movements of an army that when battle occurs it shall encounter the enemy with increased relative advantage, and also to force the enemy to abandon territory and perhaps surrender even without battle."

STATESMANSHIP AND DIPLOMACY.

In the conduct of campaigns, questions of statesmanship and diplomacy, which may be called political questions, must frequently be considered, especially in a country with a popular government like ours. Since under such a government not only the support of the army but its very existence depends upon the will of the entire people, it becomes necessary at times for the government, in

order to arouse popular enthusiasm, to adopt measures which may not have a direct connection with purely military considerations.

MILITARY OBSTACLES.

It is obvious to the least instructed that large rivers and mountain ranges, and other natural obstacles, must exercise a powerful influence on military operations. The time and expense of throwing bridges over wide streams and of making roads over high ranges of hills to meet the usual highways of the country have to be carefully considered in all strategical problems; e. g., in the war of the Rebellion the Alleghanies, extending from Pennsylvania to Alabama, sending streams to the east into the Atlantic Ocean and to the west into the Mississippi River, and separating the armies of the East and West, had great effect upon the general conduct of the war. In the minor operations of the Army of the West, Grant's preparations for attacking Missionary Ridge at Chattanooga entailed the improvisation of some more than 100 boats for getting his army across the Tennessee River under fire of the Confederate army. Obstacles also offer opportunities to skill and talent in opposing an enemy, to turn them to account defensively and employ them as means of temporarily retarding an assailant.

FRONT OF OPERATIONS.

The front of operations is the line joining the heads of columns of an army advancing, or its rear, retreating.

In the advance of an army before it reaches the vicinity of the enemy, this line may be prescribed in the orders of march.

A single corps may cover a front of from 6 to 10 miles and a division 3 to 4 miles, but when the opposing armies concentrate for battle the front occupied by an army corps may not exceed 1 to 2 miles.

At the beginning of a war the front of operations being the frontier of a state or the "*strategical front*," should be so occupied as to enable the nation to meet any hostile advance and to allow a strong aggressive movement to be inaugurated without indicating to the enemy its point of departure.

In nations which have large standing armies the preliminary steps for this deployment are taken by establishing large garrisons near the frontier or proposed front of operations, but in nations not provided with large armies in times of peace, as is the case with the United States, this deployment can only be made by sending troops to the different parts of the front as soon as they are raised, trained and equipped. At the commencement of the War of the Rebellion the strategical front of operations was very extensive, from Washington, D. C., to the State of Missouri.

BASES OF OPERATIONS.

By the base of operations is meant that part of a country from which an army moves out for an offensive campaign, to which it falls back in case of a reverse, or which serves as a point of support in defensive operations.

The base of an army generally consists of several fortified or naturally protected places within supporting distance of each other, which may serve as a second strategical line of operations.

When invading a country from the sea and seizing one of its harbors and landing an army from ships, the base is generally limited to one place and is attended with great dangers. Active measures must be at once taken to push forward and establish a more extended base within the country, or to capture other contiguous harbors, thus using the coast line as a base, with the navy as an auxiliary force, and the sea for communications.

As a campaign progresses new bases become necessary farther to the front, called secondary or *successive* bases. As a rule successive bases should not be separated by more than 5 or 6 days' march. But when there is a good system of railways between bases they may be farther separated.

A base should be selected with a view to, and should be prepared for, defense, and its form should be well considered.

A base may be straight, convex or concave towards the theatre of operations, and the form of the base of one contending nation naturally makes the other of corresponding form.

LINES OF OPERATIONS.

That territory between the base of operations of an army and its front of operations which contains the wagon roads, railroads and water ways, by which the army advances and receives its supplies, is called the *line of operations*.

When these routes of travel are within easy supporting distance of each other they constitute a single line of operations; when they are separated into two or more groups several days' march from each other they are called double or multiple lines of operation.

A line of operations becomes, after the army has marched over it, the line of communication, supply, reinforcement and retreat, along which are established temporary hospitals and depots of supplies. These should be not more than 20 miles apart on wagon roads, or 100 miles apart on railroads. These roads making up the line of communication of an army will be filled with trains and men so essential to the efficiency and very existence of an army, that must be carefully guarded, and if an enemy gains possession of them, they must be retaken within a few days or the army will be in danger of complete destruction.

PLAN OF CAMPAIGN.

In planning a campaign the first thing to decide is whether it shall be *offensive* or *defensive*. The considerations which determine this are political and geographical, as well as purely military, e. g., there were military, political and geographical reasons why the North took the offensive in the War of the Rebellion, and equally evident ones, why the Confederates adopted a general defensive plan of campaign.

During its progress a defensive campaign may be changed into an offensive one, or vice versa.

The general *objective* of an offensive campaign next to beating the enemy's army in the field, will naturally be the capital of his country, as nothing is so disheartening or humiliating to a people as the capture of their seat of government.

In working out the details of a plan of campaign the general considerations are summed up in one rule: "Strike and cut your enemy's communications and protect your own."

GENERAL LEE'S CAMPAIGN INTO PENNSYLVANIA, 1863.

Though the War of the Rebellion was a *defensive war* on the part of the Confederates, General Lee in 1863 made a bold *offensive campaign* with his army of Virginia, and a brief outline of it will be used here as an example.

With its smaller population and more limited resources than the Northern States, the Southern Confederacy had been compelled to see the war confined to its own area. In the West the Northern armies had already advanced into southern territory, and in the East the ports of the Confederacy were blockaded and the land forces chiefly confined to Virginia.

Once before, in September, 1862, the Confederate Army of Northern Virginia had crossed the Potomac with the intention of invading the Northern States, but the result of the battle of Antietam in Maryland had caused a retreat back to Virginia and the abandonment of General Lee's cherished plan, for a time. But early in 1863 Lee again decided on a campaign which would carry the war into the heart of Pennsylvania, amid the rich farms and prosperous towns from which he could supply his army, and menace Washington and the lines of communication of the Northern Army as well as its base of operations.

This was just after the Confederate successes at Chancellorsville and Fredericksburg, which left Lee's front of operations along the Rappahannock River with the Army of the Potomac under command of General Hooker directly in front of him, between the Rappahannock and Washington. Lee's and Hooker's armies were then of about equal strength, in round numbers 80,000 men each.

Lee's plan was to detain the Union army before Fredericksburg by a large display of troops, then to turn its right and move up the Shenandoah Valley under cover of the Blue Ridge Mountains. See map of a part of Virginia, Maryland and Pennsylvania. Plate XVI.



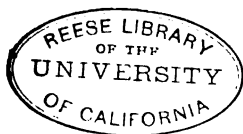
Plate XVI.

SCALE
1 inch = 12 miles

On the 3d of June, 1863, Lee put his army in motion and accomplished the strategy of his campaign up to the decisive battle of Gettysburg (which at one

time it almost seemed that he had won). Had he won this battle his bold strategy would have been a remarkable success and certainly endangered the Union cause. It would have uncovered Baltimore and Philadelphia to his army and secured abundant supplies while it rested and recuperated. Washington would have been endangered and very probably occupied by Lee, and with the discontent that prevailed in the North, and opposition that politicians were making to the prosecution of the war, a sentiment of peace might have been created which would have enabled Lee to dictate terms to the Federal Government. This, however, is only the military surmise; results were otherwise. Lee's defeat at Gettysburg upset the *morale* of the Confederacy and invasion of the North was never again possible.

The details of this battle will be given to students in the next chapter, as it is considered the "decisive battle" of the war as well as modern history.



CHAPTER XII.

BATTLE OF GETTYSBURG—1863.

The foregoing pages contain the detailed instruction, leading the student up, step by step, to fighting a battle, and as the plan of Gen. Lee's campaign into Pennsylvania, of 1863, has been taken as a *model* for a strategical plan, Gettysburg seems to be the natural model battle with which to conclude this book.

THE TWO CONTENDING ARMIES.

UNION ARMY.

Major Gen. George C. Meade relieved Gen. Joe Hooker from command of the Union Army ("Army of the Potomac") near Frederick, Maryland, June 28th.

There were then in the army about 80,000 men and 300 guns, besides Pleasanton's 10,000 cavalry and 27 guns.

The Army was organized as follows :

First Corps—Gen. John F. Reynolds—3 divisions.

Second Corps—Gen. W. S. Hancock—3 divisions.

Third Corps—Gen. Daniel E. Sickles—2 divisions.

Fifth Corps—Gen. George Sykes—3 divisions.

Sixth Corps—Gen. John Sedgwick—3 divisions.

Eleventh Corps—Gen. O. O. Howard—3 divisions.

Twelfth Corps—Gen. A. S. Williams—2 divisions.

Cavalry Corps—Gen. Alfred Pleasanton—3 divisions and two brigades horse artillery.

Artillery Reserve—Gen. R. O. Tyler—5 brigades.

CONFEDERATE ARMY.

(Army of Northern Virginia.)

Gen. Robert E. Lee, commanding.

First Corps—Gen. James Longstreet—3 divisions.

Second Corps—Gen. R. S. Ewell—3 divisions.

Third Corps—Gen. A. P. Hill—3 divisions.

Cavalry Corps—Gen. J. E. B. Stuart—9 brigades.

This army consisted of about 70,000 men and 190 guns, besides Stuart's cavalry, 10,000 men and 16 guns.

It will be noticed that the two armies were differently organized as to numbers. The Union Army into seven corps, and the Confederate Army into three Corps—(besides the cavalry of the two armies) so that each corps of the Union Army represented a *seventh* and of the Confederate a *third*. The same ratio extended to the divisions and brigades.

OPERATIONS PREVIOUS TO JULY 1ST, 1863.

As stated in the previous chapter, Lee's plan was a *feint* against the front of the Union Army along the Rappahannock River in Virginia, while he crossed the bulk of his army over the Blue Ridge mountains and moved down the Shenandoah valley into Pennsylvania, under cover of these mountains. This plan was successfully accomplished until the Union Army was met in battle at Gettysburg.

As soon as Lee's plan was discovered, the Union Army, first under Gen. Hooker, and later under Gen. Meade, swung round on the east side of the Blue Ridge so as to cover the Federal Capitol at Washington, but was several days' march behind Lee's army.

Lee's army crossed the Potomac River by the upper fords between Harper's Ferry and Williamsport. The Union Army crossed the Potomac in the vicinity of Leesburg, Va., and Frederick, Md. Lee pushed on via Hagerstown towards Harrisburg, on the Susquehanna River (See Plate XVII) until on June 27th his

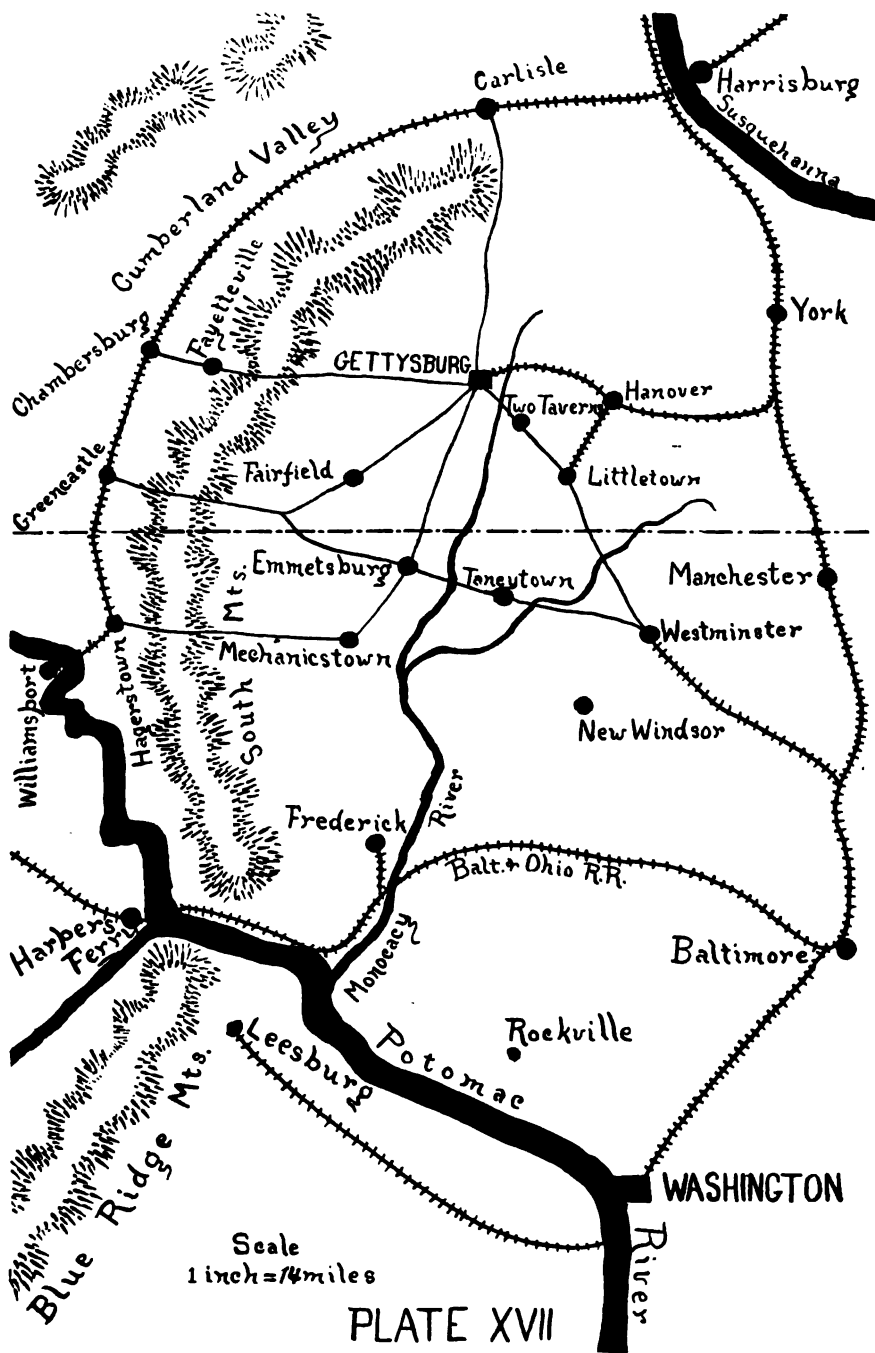


PLATE XVII

several corps were located as follows : Longstreet's corps at Chambersburg, Hill's corps at Fayetteville, two divisions of Ewell's corps at Carlisle, and one division (Early's) at York. Stuart's cavalry was at this time raiding near Rockville, Md., between the Union Army and Washington,—in an injudicious attempt to ride around the Union Army, threaten Washington and join Lee in his advance upon Harrisburg somewhere near Carlisle or York. Some think that this movement of Stuart's, which Lee not only knew of but approved, cost him the battle of Gettysburg, as Stuart only joined Lee's main body when the battle of Gettysburg was nearly over, and left Lee practically without cavalry during this battle.

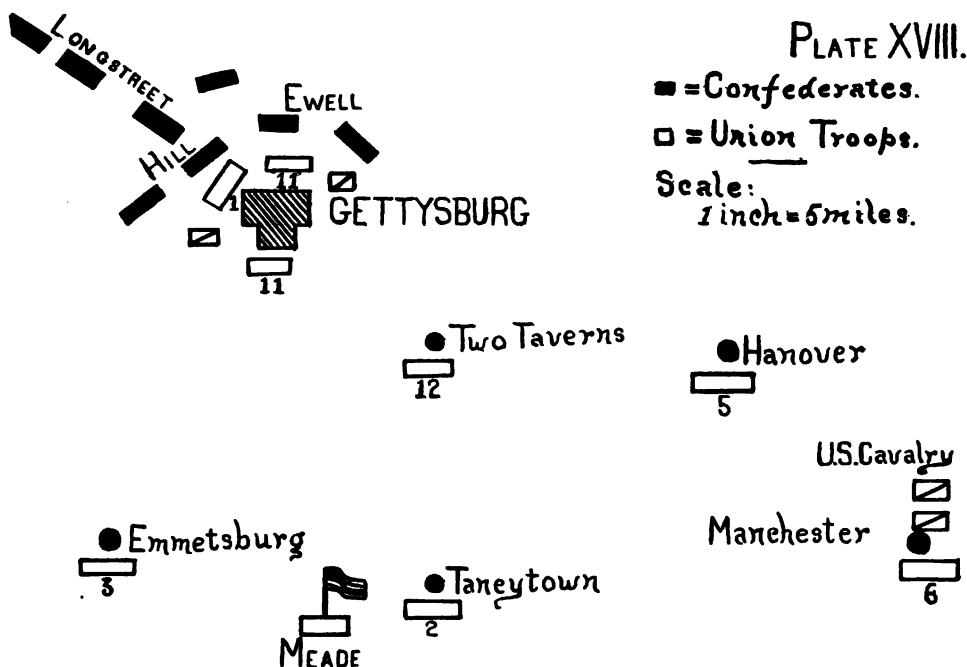
At the time Gen. Meade relieved Gen. Hooker of command of the Union Army, the Army was in the vicinity of Frederick, Md., and Meade's plan was to throw out his several corps in a fan shape towards the Susquehanna River and advance in that direction with three corps on the left to defend that flank against Longstreet and Hill.

The general idea of Meade's advance being to interpose between the enemy and Philadelphia if he went north, or between him and Baltimore and Washington if he turned back.

The cavalry took positions nearly as follows : Buford's division on the left flank near Fairfield ; Gregg's division on the right flank near Westminster, and Kilpatrick's division in advance of the center at Littletown, and the other seven corps were between Emmetsburg and New Windsor. Upon learning of the disposition and movements of Meade's Army, on June 28th, Lee saw the danger of the Union Army interposing between him and Williamsport to cut off his communications and line of retreat, so he turned back and determined to prevent an attack on his rear by threatening Baltimore, with his whole force, and cause the Union Army to march farther east and prevent it from operating in heavy force in the Cumberland valley.

On the night of June 28th Lee ordered all of his corps to concentrate at Gettysburg, and Longstreet and Hill moved in from Chambersburg, and Ewell

from Carlisle and York to the positions to the north and west of Gettysburg, shown in Plate XVIII.




Meade, learning through Buford's scouts that Lee was concentrating upon Gettysburg, proceeded to dispose his forces about Gettysburg as shown in Plate XVIII. Buford's cavalry held Seminary Ridge to the west of Gettysburg. The First Corps (Reynolds') and the Eleventh Corps (Howard's) were at Gettysburg; the Second Corps (Hancock's) at Taneytown, where were also Meade's Headquarters; the Third Corps (Sickles') at Emmetsburg; the Twelfth Corps (Williams') at Two Taverns; the Fifth Corps (Sykes') at Hanover; the Sixth Corps (Sedgwick's) and Gregg's and Kilpatrick's divisions of cavalry at Winchester.

The battlefield, (see Plate XIX,) was between two small streams. Rock Creek on the east and Willoughby Run on the west of Gettysburg.

Gettysburg was a village having about three thousand people, west of which was *Seminary Ridge*, running north and south.

BATTLE JULY, 2nd

 = Confederate.
 = Union.



South of Gettysburg there was still higher ground, *Cemetery Ridge*, running also north and south, and terminating at its southern end in two detached hills, *Little Round Top* and *Round Top*.

The streets of Gettysburg ran to the base of Cemetery Hill, and just south-east of Gettysburg was Culp's Hill, well wooded.

BATTLE OF JULY 1ST.

On the morning of July 1st Buford's cavalry was occupying Seminary Ridge and attempting, by dismounted *fire action*, to delay Hill's Corps, advancing along the Chambersburg road. Buford's skirmish line was disposed in an arc from west to north-east round Gettysburg.

Buford opened fire about 8.00 A. M., when Hill's skirmishers were at Wiloughby Run, and though overmatched, he delayed Hill till Reynolds reached Seminary Ridge with the First Corps. Reynolds was killed very soon after arriving there. At about 10.45 A. M. Howard, who followed him with the Eleventh Corps, succeeded him in command and practically conducted the battle during the remainder of the day. At 2.45 P. M. the Confederates had been repulsed all along the line; but Ewell's Corps came into the town from the north and east and Howard was compelled to abandon the town as well as Seminary Ridge, and file back and entrench on Cemetery Hill, south of Gettysburg. The Union troops had made a good fight, but they had been outnumbered on the field—16,000 men against 22,000 Confederates.

Meade, upon learning the situation, hurried Hancock forward to take command. Hancock arrived about 4.00 P. M., and the Third and Twelfth Corps arrived later in the day. Slocum assumed command while Hancock returned to Meade at Taneytown to inform him of the situation. Meade hastened forward and arrived at Cemetery Hill at 1 A. M. July 2nd, and began preparations for the following day.

BATTLE OF JULY 2D.

Plate XIX shows the positions on the morning of July 2nd. At 9.00 A.M. the corps of the Union Army had all arrived except 15,000 men of the 6th corps. The 1st and 11th corps occupied Cemetery Hill; the 3d corps had come from Emmetsburg and taken position near the left; the 12th corps arrived from Two Taverns and took position on the right, on Culp's Hill. The 2nd corps came from Taneytown and took position in the centre. Part of the 6th corps came in from Manchester and took position on the left of the 2nd corps. The 5th corps came from Hanover and took position on the left of the Union Army at Round Top.

Round Top was about three miles south of Gettysburg.

By a careful comparison of Plates XVIII and XIX the progress of the battle and the movement of the corps up to the morning of July 2nd can be easily followed.

Lee's army had closed in as follows: Ewell on the left occupying the town of Gettysburg and ground to the north-east of Culp's Hill. Hill's corps on Seminary Ridge, and Longstreet moved to attack the left of the Union Army towards Round Top and Little Round Top.

Lee opened the battle against the left of the Union Army, and Ewell was ordered to move forward when he heard Longstreet's guns, but he did not do so until 5.00 P. M.

When night ended the battle it was hard to say on which side the advantage lay—still Meade had repulsed the attack and the positions of the two armies remained about the same as the night before.

Meade called a council of war after which he decided to continue to defend his position, and Lee made no change in his plan of battle, intending to resume his tactics of the day before and make a double attack, attacking both wings at the same time.

BATTLE OF JULY 3RD.—(See Plate XX.)

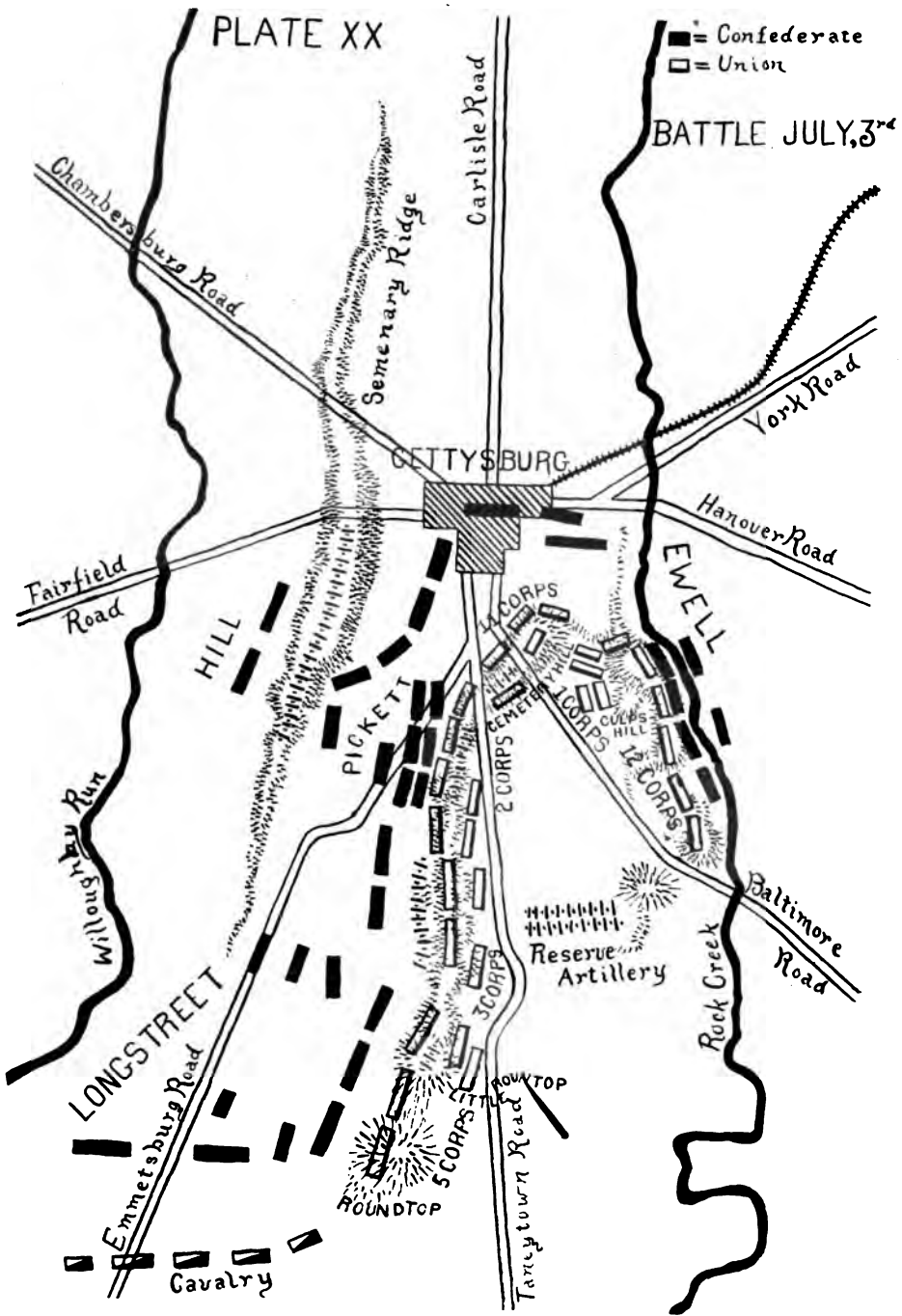
After seven hours' fighting on the morning of the 3rd, Meade's Army was victorious on the right and drove the Confederates from Culp's Hill, but on the extreme left the Union charge was repulsed. About this time (1.00 o'clock P. M.) the great artillery duel commenced in the center and resulted in Meade's guns being silenced.

Then the famous "*Picket's charge*" from the Confederate center, was made, which came near ending the battle in favor of Lee; but the Union Army there was intrenched behind stone fences and fire so concentrated upon Picket that his division was driven back in confusion.

This ended the battle of Gettysburg, and soon the whole Confederate line was in retreat. Meade having no preparation for a counter-blow, Lee was allowed to retreat without much trouble, and move back into Virginia practically by the route he came.

This battle terminated Lee's offensive campaign and was the turning point in the war. The casualties on each side were about 23,000 men, killed, wounded and missing—a remarkable percentage in history—27 per cent of the Northern Army and 36 per cent of the Southern Army.

The above is but an outline. Every American student seeking proficiency in the art of war should follow out the details of this battle in the Comte de Paris History of the Civil War in America, and then visit the battlefield of Gettysburg.



APPENDIX.

Notes Upon the Cuban War, 1898.

“ When war is declared, the time for preparation, the time for training is past, the day of action has come. If the weapon is not well tempered, wants edge, is useless, the responsibility rests with those who allow it to become so.”—
Home, Precise on Modern Tactics.

The above question seems to be a good text upon which to discuss the Cuban war service of the summer of 1898.

It is not the purpose of this article, however, to speak censure or praise concerning any of the actors in this war, except to make the general assertions that the results accomplished by this little army of 17,000 men, which was loaded upon transports in Tampa Bay, and sailed for Cuba June 14th, and returned to Montauk Point, Long Island, August 17th, accomplished in these nine weeks some of the most glorious results in history, under conditions of service the most trying that troops have ever encountered, and established before the world the highest respect for the American soldier.

When suddenly called to concentrate at Chickamauga, Ga., for the Spanish War, in April, 1898, the regiment (First U. S. Cavalry) in which I had served as an officer for nearly twenty-six years, had not assembled as an entire regiment since its several companies separated at New Orleans just after the close of the War of the Rebellion in 1865, consequently those who had served in the regiment for over a quarter of a century, although familiar with Indian warfare by small parties, were for the first time given the opportunity of observing the larger operations of war.

Not only did regiments come together for the first time within a generation, but the brigades and divisions of troops living in large camps brought out features

of service before unthought of. This sudden mobilization, even before the army started for Cuba, was an education which those even older than myself had not had, for it had been thirty-three years since the armies of the War of the Rebellion disbanded. Not only the volunteers, but the regulars realized how little resemblance the conditions of an army at peace bore to the realities of actual service.

We had been accustomed to a comfortable allowance of baggage and cooking utensils, but now came down to what a soldier could carry himself. Then came the novel experience to each soldier of making his coffee in his own tin cup, frying his bacon in his meat ration can, and husbanding what was dealt out to him so as to make it last for its required period, instead of complaining about what the company cook provided for him. He learned that the little individual canvas bags issued by the Ordnance Department for carrying ground coffee, sugar, pepper and salt, were practically useful to the soldier. He learned to carefully roll his little piece of bacon up in a clean cloth and put it away in his haversack for another meal after slicing off enough to fry for his present wants, instead of complaining to his company commander about the roast beef, pies and "plum-duff" that others had prepared for him in the barrack mess-hall.

He learned to put up, with his "bunkie," a shelter tent for the joint habitation of the two; and to ditch it before lying down to sleep at night; and how with the blankets and over-coats, carried on the back of the two soldiers by day, their only bed was prepared for the night; and if they had thrown away these articles that they would sleep uncomfortably. He learned to take advantage of moments of leisure to go to the nearest stream and wash his underclothes himself, instead of taking them to the laundry, and this, too, without contaminating the water of the stream for drinking purposes, for in all well regulated large camps the water is under guard, and men have to improvise some device for carrying water away from the stream for bathing themselves as well as washing their clothes, e. g., along the San Juan river in Cuba men would dig a small hole in the ground, place a rubber blanket or "slicker" in it, and bring sufficient water in a number of canteens, if they could get no pails.

He learned to wash his meat ration can, knife, fork, spoon and tin cup immediately after each meal, so that they would not become musty and spoil his next meal. He learned to skirmish for fruit as a laxative in his diet when no vegetables were issued, as it is bound to be the case that only bacon, hard bread, coffee and sugar can be gotten to soldiers on the firing line for days at a time. He learned at evenings to fill his canteen with fresh water and hang it up with the cork out to cool over night, with the canvas wet, so that he could have cool water in the morning, while his thoughtless companion would either drink sickening warm water or "sponge" from his more provident friends. He learned on the march to drink in the early morning quite as much water as his taste required, and to refrain from drinking as much as possible through the day's march; but to rinse his mouth frequently and spit out the water.

He learned that his "gun" and ammunition are the first things to care for, and to put them within quick reach when lying down to sleep at night, as he was sure to present them for inspection at the Reveille Roll Call in the morning, even if he did not have to turn out suddenly for service in the darkness of the night.

He learned that the Surgeon, if there was one to attend the sick call in the morning, carried little or no medicine *except quinine pills*; that the surgeon is with the troops in the field principally as a surgeon, not as a *doctor*; that a soldier must doctor himself by the proper dietetic and sanitary precautions, and that in war there can be no "malingering," that soldiers must keep along in their place by their own will or drop by the way-side to shirk for themselves.

These were some of the developments which would never have come to this generation of soldiers, even in the regular army, had it not been for this Cuban War service, with its extreme conditions of climate, deprivations and hardships.

Officers came down to living about the same as their men, except that they paid some soldier to cook their food and roll up what extra bedding they could find transportation for.

Company officers suddenly found manifold sanitary precautions necessary, which had not been thought of, even in Indian service: because Indian service had been conducted by small parties over large expanses of country where it was customary to "move camp" when filth collected rather than police the grounds.

Experience taught company commanders that upon halting for a camp, or bivouac, a fatigue detail must at once be made, for digging a company sink; that this sink must be 4 feet deep at least, 6 feet deep if likely to encamp in the place more than one night,—and that three times each day fresh earth must be thrown into the sink, that when a sink gets filled to within 2 feet of the top of the ground it must be entirely filled up with earth and a new one dug.

That sinks must not be located near the water supply. That guards must at once be put over the water supply, and no one allowed to bathe or wash clothing in the creeks or small rivers.

High and well drained grounds must be selected for camps when other military considerations are not paramount to the health of the troops.

Deep holes were usually dug at the end of each company street where all scraps of meat, refuse from cooking and slops were thrown and the refuse in the holes, covered three times each day with fresh earth.

While this latter method *usually* prevailed, in some of the *best regulated camps* the refuse was cremated daily, and as a brigade inspector, I became convinced that in every camp or garrison, whether in peace or war, the refuse should be cremated daily in a suitable oven constructed therefor.

Men have to be carefully watched that they bathe and wash their clothing, otherwise quite a percentage of men will neglect this altogether.

Arms and ammunition must be minutely inspected at Reveille each morning.

Picket lines where animals are secured must always be under guard, and all manure taken away and burned each morning. These were some of the sanitary measures, the neglect of which caused much sickness in camps where raw and undisciplined troops came together in large camps and for which it was hard to demonstrate the necessity, to Volunteer troops.

Another fault of company commanders in our peace instructions was clearly demonstrated—I have to admit the fault myself—it was the lack among the men of individual instruction in cooking. We have been accustomed in garrison to select a good cook and keep him in the kitchen, while it should be the practice for all men to take turn about for ten days at a time. Then all will become cooks in the course of time.

It should be the custom in all practice marches and ordinary field service for each man to cook his own food, just as he will have to do in war service, and in every camp of instruction whether *militia* or *regular army* this should be done.

There should be no kitchens in camp ; only a store-house where the raw material composing the soldiers' rations should be issued in bulk every day to the Company Quartermaster Sergeant, and by him divided between the chiefs of squads and by them issued direct to each man, who should cook his own food under the direction of the chief of squad.

I was told during service in Cuba, by old sergeants, that "many men made themselves sick by slicing off raw bacon, and eating it without cooking and going without coffee because they either did not know how, or from the lassitude attending malaria were too lazy to cook it."

FIELD TRANSPORTATION.

Wagon transportation can be gotten together very quickly, as was the case when this war broke out, but it cannot be used in all places, and could not be used to advantage in Cuba. Pack trains, what few there were, did excellent service.

Wagons must be confined to the roads, and roads cannot be constructed fast enough to keep up with moving fighting armies. And in rainy times wagons cannot move at all even on roads such as will be found "across country."

If the Government had kept up the pack trains it used to have when the Indian fighting was at its height in the West, our army would have fared better in Cuba.

There should not only be pack-trains to be used intact, but at least one pack

animal with pack outfit (better two) should be furnished each infantry company. Then the company could pack its own rations and ammunition from near depots or from wagon trains to the "fighting line," and not have to wait for the Quartermaster's trains, which from the very nature of the service cannot be gotten around in time.

Had each company in Cuba been supplied with one pack animal no one need have gone without a single meal. These pack animals should be component parts of each company, for which the company commander is responsible.

NOTES ON PACKING.

Fig. A shows a mule, packed with promiscuous packages of company baggage.



Fig. A.

Mules are the best pack animals, but any animal can be used, and men of a company should be made familiar with the details of packing. One example of two experienced packers, packing a mule, with the men of a company gathered

around, will suffice in the matter of throwing the ropes, etc., so that the men will work out the rest.

Until mules are trained to move in column, they should be led. A pack train of any size should have a "bell-horse." Mules soon become attached to him and will follow him anywhere.

The "burros" used so much in Arizona for packing, would make good company animals, as they "brouse for a living" and carry almost as heavy loads as mules. All the wood for some military posts in Arizona has been packed from the mountains on the backs of these little animals.

INTRENCHING TOOLS.

We were deficient in the proper intrenching tools in Cuba and men had to carry the heavy picks and shovels of the Quartermaster's Department on their backs. There should be light portable intrenching tools, such as the European armies have, carried by two men of each squad.

Our men at first threw picks and shovels away if they were not watched, but after the battle of San Juan, July 1st, they would sacrifice their clothing rather than picks and shovels. These men very quickly made shelter for themselves under fire, as they arrived at the successive hills in advance from the San Juan river towards Santiago.

MACHINE GUNS.

It was demonstrated at San Juan Hill that one or more Gatling (or some equivalent machine guns) should be with every battalion of infantry, as well as with every cavalry squadron.

There were most excellent results from the Gatling guns manipulated by the men from the ranks of infantry and cavalry companies on San Juan Hill,

July 1st and 2nd. These guns should not be in batteries as artillery, but singly or in pairs for adjunct work with infantry and cavalry.

It is better to have two together so that if one gets out of order the other can be worked. There should be spare parts carried with each gun for its repair,—it pays well to do this.

THE HOTCHKISS 2-POUND MOUNTAIN GUN.

Fig. B. shows the Hotchkiss 2-pound mountain gun which was with the infantry and cavalry during the campaigning in Cuba.

One or two mules may be used on each carriage.

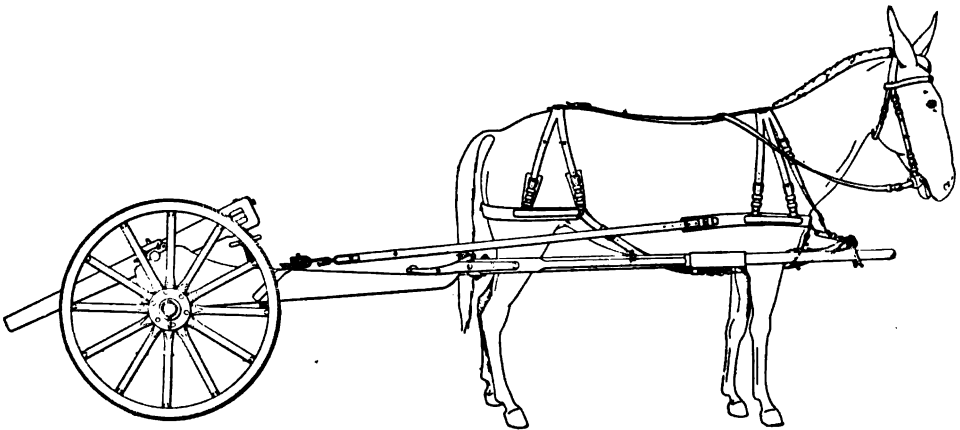


Fig. B.

The mule shown in the harness is the near mule, the off mule being removed to show the pole, etc. The gun carriage may also be transported on a pack animal. See Fig. C.

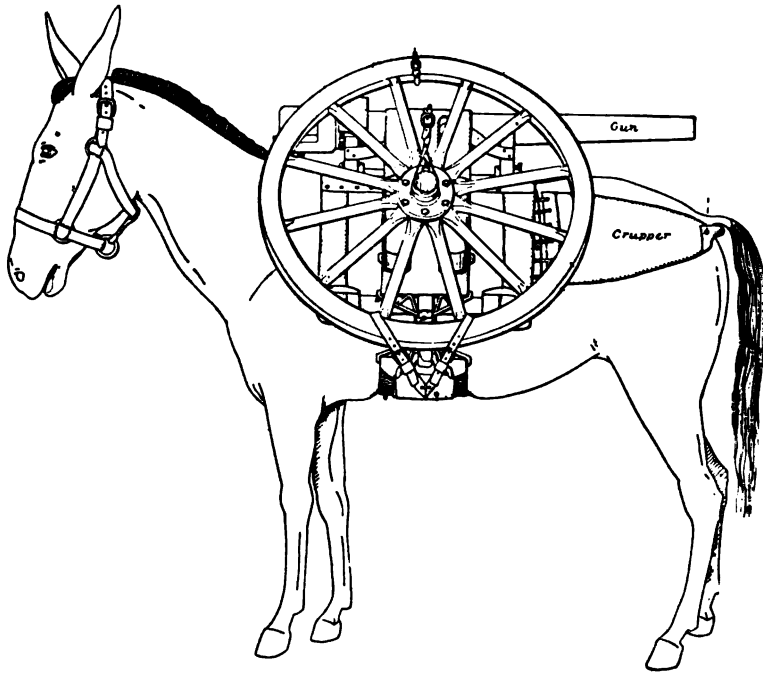


Fig. C.

These guns did excellent adjunct work with the skirmishers both in the open and in the trenches during the fighting attending the advance upon Santiago de Cuba. Two types of projectiles are used, shells and cannister. The shell is of cast iron similar in shape to the larger artillery shells, shown in figure 33 of Chapter III, with pointed percussion fuse. Fig. D shows the cartridge case and cannister. The cannister consists of a tin case holding thirty, hardened lead, one-ounce bullets.

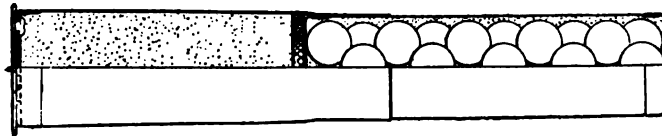


Fig. D.

THE RATION.

We had a new meat component in our travel ration while on transports, canned roast beef, which being new to us, no one seemed to know how to handle. It is particularly unfortunate that, right in war, we have to experiment with new things. Canned roast or boiled beef may eventually turn out to be a good thing in a campaign, for a change. But in the hot climate of Cuba too much meat was eaten.

There should be more vegetables and less meat in such a climate. Canned tomatoes proved to be a most excellent article. If we go for service in Alaska we should take more meat and less vegetables, but in Cuba more vegetables and less meat.

On the whole, our ration proved to be a good one. The newspapers did an injustice by criticising our ration from the citizen's home standpoint. The regular field ration (bacon, hard-bread, sugar and coffee) is the result of many years experience, and we shall have hard work to improve it, except that the component parts may be varied when serving in new climates.

SMALL ARMS.

We have no apologies to make for our marksmanship, it was what won our army fame. Our soldiers knew that they could shoot well, and this knowledge gave them such confidence that they rushed forward and were never stopped. Our magazine gun was as good as the "Mauser" used by the Spaniards, and between the two it was probably the better arm. The volunteer infantry were unfortunate in having the obsolete black powder guns. This however was due to a parsimonious policy, not to the fault of the militia from which the volunteers came. They had been trying for years to get the "up-to-date" guns.

The First Volunteer Cavalry (Rough Riders) had the Krag-Jorgenson rifle and used it well.

The Government should keep in the hands of the militia just the same gun that they will use in war, and which the regular army has. The Government

can better afford to throw away an outfit of guns every year as improvement goes on than to give its soldiers inferior weapons in a fight, or even put new guns in their hands then.

These views are criticisms upon no one, it is simply a long state of peace that has naturally created a sentiment among our people that most any weapon will do for parade purposes. I would strive to correct this idea in the young students who are to become the law makers as well as the soldiers of the future.

FEMALE NURSES.

While the war in Cuba showed splendid work by the women of the "Red Cross" and others who were employed as nurses, still the field is no place for women. They may perhaps be in central hospitals, but let us rather teach our men to nurse themselves and each other, than to take women to the front.

SEA TRANSPORTATION.

Such an expedition as sailed from Tampa Bay in June, 1898, was never before thought of in our "soldiering." It was a new experiment to suddenly improvise thirty-four transports, for taking an army from our country to and in the face of an enemy, on an unknown coast, and its successful accomplishment was due to American enterprise, which always rises to an emergency.

This transport service will hereafter take care of itself. There was bungling of course, but we must admit it a great success to so quickly move an army of 17,000 men to Cuba, and land them at a strategic point, in the face of an enemy, without the usual landing facilities, with a loss of only four men.

CAMPS OF INSTRUCTION.

The war clearly proved the necessity for what the War Department has for several years been trying to bring about, viz.: Annual camps of instruction where large bodies of the militia (or National Guard) of the states, and regular troops come together for manoeuvres. There should be one of these encamp-

ments for three weeks each year somewhere in New England, where the troops from all New England and the Middle States could mobilize. There are plenty of abandoned farms for sale which the National Government could buy cheap. I should locate such a camp in Connecticut near New York City.

If such an encampment could be held early in June, the students from a hundred Military schools and Colleges could assemble with the troops. Corresponding camps could be located for other sections at convenient points, e. g. Chichamauga Park, Ga., Fort Leavenworth, Kan., San Francisco, Cal., etc.

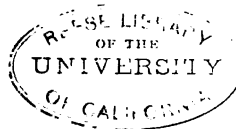
The history of the Cuban war is only a repetition of all other wars in this country. The great bulk of all troops in these wars came at their commencement from civil occupations. There were in round numbers 250,000 men in the army for this Spanish War of 1898, while at its declaration the regular army consisted of only 25,000 men. It therefore behooves us in time of peace to direct our main efforts to the militia from which the Volunteers will be drawn, in time of war, and use our regular army as an object lesson to show the custom and ways to follow.

The above outlined scheme of Annual Encampments will cost money for transportation, but it will be money well expended, and it is doubtful if such a scheme aggregates a greater total expenditure than has been made upon the Militia of the several states in times past.

We should not forget that a potent factor in our military education scheme, exists in the military college system, which has been developing far beyond the public knowledge, under the Land Grant College Act of 1862.

I have been on military college duty eleven years of my service, and it pleased me to meet hundreds of my pupils doing excellent work in the Spanish War, scattered through almost every regiment of regulars as well as volunteers.

H. E. TUTHERLY.





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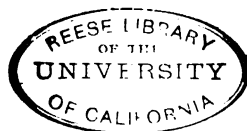
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ERRATA.

- Page 9—Last line, should be a torch between flags.
- Page 10—Line 4, chaplain wears shoulder-strap with silver cross in center.
- Page 12—Line 7, adjutant and quartermaster rank as captains.
- Page 14—Lines 15–16, adjutant and quartermaster as captains.
- Page 35—Last words, “engineer corps,” should read “bridges, ferries, etc.,
page 250.”
- Page 54—Line 11, “captains” instead of “lieutenants.”
- Page 56—Act March, '99, authorizes regimental bands outside strength of
companies.
- Page 57—Act March, '99, authorizes “drum major” to each regiment.
- Page 78—Line 12, summary court now has jurisdiction both in peace and war,
and Act, '98, otherwise changes jurisdiction.
- Page 79—Last line but one, “4 officers” should read “3 officers.”
- Page 202—Line 5 from bottom, “south” to read “north.”
- Page 206—Line 3 from bottom, “patrols” to read “parole.”
- Page 233—Line 6, “pages 80 and 81” to read “figures 80 and 81.”
- Page 267—In Fig. 122, second line, “Firin Line” to read “*Firing Line*.”
- Page 272—Last line, “Fig 126” to read “Fig. 127.”
- Page 283—Line 4 from bottom, “shafts” to read “shalves.”
- Page 291—Scale should be “2 miles=1 inch.”
- Page 296—Line 6 from bottom, “left patrol” to read “*left patrols*.”
- Page 308—Scale should be “1 inch=24 miles.”



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